

Preliminary Staff Assessment

**CALIFORNIA
ENERGY
COMMISSION**

SALTON SEA GEOTHERMAL UNIT #6 POWER PROJECT

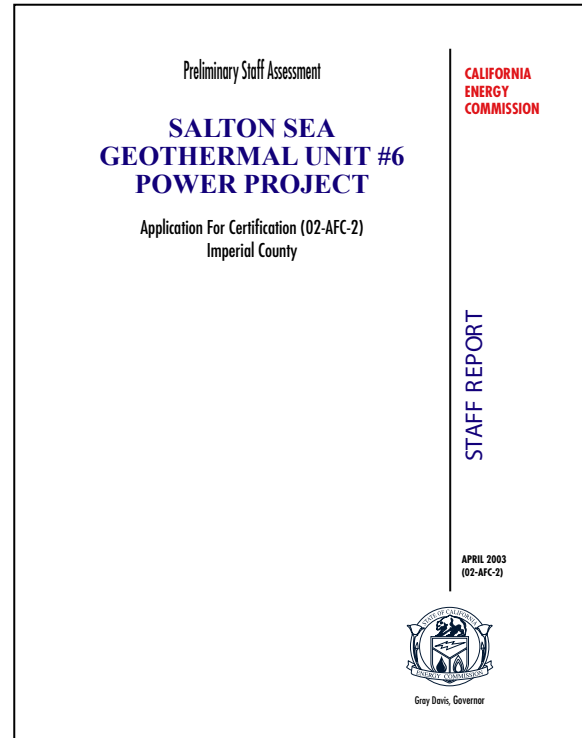
**Application For Certification (02-AFC-2)
Imperial County**

STAFF REPORT

**APRIL 2003
(02-AFC-2)**



Gray Davis, Governor



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EXECUTIVE SUMMARY

INTRODUCTION

This Preliminary Staff Assessment (PSA) contains the California Energy Commission staff's independent analysis and preliminary recommendation on the Salton Sea Unit 6 geothermal project (SSU6). The SSU6 and related facilities, such as the electricity transmission lines, and water supply are under the Energy Commission's jurisdiction. For geothermal power projects, the Energy Commission evaluates all aspects of the project except for geothermal production and injection wells that are permitted by the Department of Conservation, Division of Oil Gas and Geothermal Resources (DOGGR), and the well pads and brine pipelines permitted by Imperial County. Both agencies intend to use the Energy Commission's Final Staff Assessment as the CEQA document for their actions.

The Energy Commission is the lead state agency under the California Environmental Quality Act, and its process is functionally equivalent to the preparation of an environmental impact report. The Energy Commission staff completes an independent assessment of the project's potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects and conditions for construction, operation and eventual closure of the project, if approved by the Energy Commission. Staff will hold a publicly-noticed workshop on the PSA and will develop its Final Staff Assessment (FSA) from comments and additional information received.

This PSA is not the decision document for these proceedings nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The FSA will serve as staff's testimony in evidentiary hearings to be held by the Committee of two Commissioners who are hearing this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The Energy Commission will make the final decision, including findings, after the Committee's publication of its proposed decision.

PROJECT LOCATION AND DESCRIPTION

On July 26, 2002, CE Obsidian Energy LLC (CEOE) filed an Application for Certification (AFC), for its proposed Salton Sea Unit 6 geothermal project (SSU6) with the California Energy Commission seeking approval to construct and operate a 185 megawatt (MW) geothermal steam-powered electric generating facility. The plant would be owned and operated by CEOE. The Energy Commission determined the application to be data adequate on September 25, 2002. This determination initiated staff's independent analysis of the proposed project.

The project area, located near the southeast shore of the Salton Sea, is within the unincorporated area of Imperial County, California. Located approximately 6 miles

north of Calipatria, on an 80-acre portion of a 160 acre agricultural parcel owned by the applicant. The parcel is bounded by McKendry Road on the north and Peterson Road on the South and is approximately 1,000 feet from the southern end of the Sonny Bono Salton Sea National Wildlife Refuge. Lying within the Salton Sea Known Geothermal Resource Area (KGRA), the project is within a two-mile radius of nine operating geothermal power projects. A more complete description of the project is contained in the **PROJECT DESCRIPTION** section of this PSA and includes figures depicting the regional setting, transmission line routes, wells and pads, brine pipelines, and proposed plant configuration.

The SSU6 would consist of a geothermal steam power plant, associated water supply, production and reinjection wells and pads, brine pipelines, two 161 kV transmission lines, a project switchyard that would connect at two locations in the Imperial Irrigation District's (IID) transmission system, the L-Line to the southwest, and the Midway substation to the east.

The SSU6 project has infrastructure elements unique to a geothermal project including a geothermal Resource Production Facility (RPF), geothermal-steam Power Generation Facility (PGF), production and injection wells and pads, above-ground brine pipelines, a brine waste solids handling system, and unique emissions characteristics.

The SSU6 includes a high efficiency condensing steam turbine with a net plant output of 185 MW. Normally, the facility will be operated in a base load mode: 8,000 hours per year or more. The renewable energy project is designed to supply capacity and energy to California's electric market, with over 85 percent of the plant output contracted to the IID for a 20 year period following project completion.

The SSU6 air emissions are quite different from those of a natural gas-fired plant. Except for drilling and ancillary equipment, NO_x, and SO_x are not emitted, but there will be emissions of ammonia and H₂S. Both ammonia and H₂S are non-compressible gasses contained in the geothermal brine. The ammonia emissions, though not a regulated emission, are of concern as a PM₁₀ precursor. The applicant proposes to purchase PM₁₀ emission credits through the Imperial County Air Pollution Control District (ICAPCD). To control emissions and impacts of H₂S, the applicant proposes to retrofit the cooling towers at an existing facility and plans to install bio-oxidizers on the cooling towers of SSU6.

PUBLIC AND AGENCY COORDINATION

The Energy Commission's SSU6 Committee conducted an Informational Hearing and Site Visit on November 19, 2002. The Energy Commission also heard testimony regarding the sufficiency of the geothermal resources for support of the project through its projected 30-year life. The hearing provided a forum for the public to learn about the project, the Energy Commission's process, and to raise their questions and concerns about the proposed power plant. In addition, publicly noticed data response workshops were held on January 8 and 9, 2003 in Calipatria, and on February 27, 2003 in Sacramento.

As stated above, several agencies are involved in the review and permitting of the SSU6. Staff is working with the Imperial County Planning/Building Department to coordinate the review and permitting of the SSU6 well pads and pipelines, and to assist in CEQA compliance for the project. DOGGR will use the Energy Commission Final Staff Assessment as their environmental documentation for well permitting.

Staff is coordinating their review with: the Imperial County Air Pollution Control District (ICAPCD), the Imperial County Planning/Building Department, the U.S. Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (ACOE), the California Department of Fish and Game (CDFG) and the Regional Water Quality Control Board. The PSA provides agencies and the public an opportunity to review the Energy Commission staff's analysis of the proposed project. The ACOE and the BLM have federal jurisdictional authority and must take certain actions to permit certain aspects of the project. ACOE has already taken their action permitting fill of a small portion of degraded wetland necessary for construction of a brine pipeline. BLM must amend the California Desert Conservation Act (CDCA) Plan to allow a transmission line corridor across a portion of BLM land. BLM is also reviewing the entire project and has requested a Biological Opinion from the USFWS regarding potential impacts and proposed mitigation for threatened and endangered species within the project sphere of influence. Due to the potential for soil contamination at project site, staff is coordinating with the California Department of Toxics And Substance Controls.

STAFF'S ASSESSMENT

Each technical area section of the PSA contains a discussion of impacts, staff's preliminary conclusions and recommendations, and, where appropriate, mitigation measures and conditions of certification. The PSA includes staff's assessments of:

- the environmental setting of the proposal;
- impacts on public health and safety, and measures proposed to mitigate these impacts;
- environmental impacts, and measures proposed to mitigate these impacts;
- the engineering design of the proposed facility, and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project closure;
- project alternatives;
- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation; and
- proposed conditions of certification.

OVERVIEW OF STAFF'S CONCLUSIONS

Staff's preliminary analysis indicates that there are eight technical areas in which additional information is needed from the applicant or where action is required from another agency prior to concluding the FSA. Below is a table summarizing the technical

areas analyzed in the PSA and LORS compliance for each area. Where the term “Inconclusive” appears, it may mean action is needed by the applicant, or an agency, and in other instances it indicates that additional information has been requested, and has yet to be provided. Air Quality, Biological Resources, Cultural Resources, Traffic and Transportation, Transmission System Engineering, Visual Resources, Waste Management, and Water and Soils Resources are discussed in more detail following the table. For a more complete discussion of the issues, please see the corresponding technical sections in this PSA. Where more information is required, this information is needed prior to staff completing the FSA.

| Technical Discipline | Environmental/ System Impact | LORS Conformance |
|---------------------------------|---|-------------------------|
| Air Quality | Inconclusive | Inconclusive |
| Biological Resources | Inconclusive | Inconclusive |
| Cultural Resources | Inconclusive | Inconclusive |
| Power Plant Efficiency | No impact | N/A |
| Power Plant Reliability | No impact | N/A |
| Facility Design | N/A | Yes |
| Geology | Impacts mitigated | Yes |
| Hazardous Materials | Impacts mitigated | Yes |
| Land Use | Impacts mitigated | Yes |
| Noise | Impacts mitigated | Yes |
| Public Health | Impacts mitigated | Yes |
| Socioeconomics | Impacts mitigated | Yes |
| Traffic and Transportation | Inconclusive | Inconclusive |
| Transmission Line Safety | No Impact | Yes |
| Transmission System Engineering | Inconclusive | Inconclusive |
| Visual Resources | Inconclusive | Inconclusive |
| Waste Management | Inconclusive | Inconclusive |
| Water and Soils | Inconclusive | Inconclusive |
| Worker Safety | Impacts mitigated | Yes |

Air Quality

- Staff believes that the project’s ammonia emissions of over 2,700 tons per year constitute a significant impact related to PM₁₀ formation, and is requesting additional information regarding the technical feasibility and cost of potential mitigation technologies identified by the applicant and by staff in this PSA.
- Staff has determined that the initial commissioning period and well flow testing operations are likely to cause exceedances of the 1-hour hydrogen sulfide (H₂S) California Ambient Air Quality Standards (CAAQS).
- Additional information and discussion of air impacts are needed regarding ammonia, PM₁₀, and hydrogen sulfide (H₂S).

- Staff will need a detailed description of how the Elmore or Leathers plant emission reductions will be obtained to offset the H₂S emissions from SSU6.
- A complete offset package for the PM₁₀ and H₂S impacts is needed for completion of the FSA as stated in proposed conditions of certification **AQ-C10**, and **AQ-C11**
- The applicant must provide a list of the specific emission reduction credits to be used to offset the PM₁₀ project emissions.
- The Imperial County Air Pollution Control District Final Determination of Compliance will need to have federally enforceable conditions of certification (see Air Quality, **Appendix A** for draft conditions).

Biological Resources

The following additional information is needed to complete the FSA.

- a letter verifying a complete Biological Assessment has been accepted by USFWS; and that the 135-day review period has begun;
- additional information regarding transmission line crossings of the Alamo and New Rivers;
- survey data and information regarding mountain plover abundance and habitat use;
- feasibility of relocating transmission lines that may be close to the Salton Sea shoreline;
- demonstration of complete avoidance of injury or death to brown pelicans and Yuma clapper rails, both listed as federally endangered and threatened and fully protected by the state.

Cultural Resources

Several resources have not been fully identified and evaluated. This information is needed to determine potential impacts and appropriate mitigation measures.

- testing and evaluation for California Register of Historic Resources (CRHR) eligibility of five archaeological sites;
- record of the resources at Obsidian Butte, including CRHR evaluation;
- documentation of consultation with Native Americans;
- documentation and evaluation of several structures along the project's linear routes including portions of the Vail Ranch, and part of the Westside Main Canal.

Traffic and Transportation

Additional information has been requested from the applicant regarding current and potential traffic impacts from truck traffic on local roads, and clarification of emergency access routes. In addition, information on the location of a private airstrip and a portion of a military low-level flying route that may be impacted by a portion of the new transmission line has been requested.

Transmission System Engineering

Staff has requested verification that the adjacent utilities, (Western Area Power Administration, Southern California Edison, Arizona Power System and San Diego Gas & Electric) confirm the acceptability of the System Impact Study and the identified mitigation measures.

Visual Resources

Staff has initially identified potentially significant visual impacts from the project at the Rock Hill Viewing Area within the Salton Sea Refuge resulting from the proposed alignment of the cooling towers at the SSU6 project. In addition, potential impacts from an unmitigated dilution water heater plume have been modeled. Staff has suggested possible mitigation strategies at a February 27, 2003 data request workshop that include possible realignment of the cooling towers, and a condenser to mitigate the steam plume from the dilution water heater. Staff has requested additional information from the applicant regarding possible mitigation of these impacts but has not received information or response from the applicant in time for inclusion in the PSA.

Waste management

Comments received from the State Department of Toxic Substance Control were inconclusive regarding the need for a Phase II soils analysis. Additional information is needed to verify the potential soil impacts from past use at the project site.

Water and Soils

Additional information is needed regarding the fresh water supply for the project before staff can complete the analysis. Staff is required to utilize a baseline for water utilization that uses the most current available data. The Imperial Irrigation District, and the applicant are working with staff to complete this information.

Environmental Justice

EPA guidelines on environmental justice state that if 50 percent of the population affected by a project has minority or low-income status, it must be determined if these populations are exposed to disproportionately high and adverse human health or environmental impacts.

In the Socioeconomics section of this staff assessment, staff presents the results of their “environmental justice screening analysis.” The purpose of this analysis is to determine whether or not low-income or minority populations exist within the potential affected area of the proposed site.

Socioeconomics Figure 1 identifies census blocks within 6 miles of the proposed project that have minority populations greater than 50 percent. Energy Commission staff has reviewed Census 2000 information that shows the minority population is 66 percent within a 6-mile radius of the proposed SSU6. Census 2000 data for the same 6-mile radius shows that the low-income population is 19 percent.

Because a minority /or low-income population is identified, staff in the technical areas of air quality, public health, hazardous materials, noise, water, waste, traffic and

transportation, visual resources, land use, socioeconomics, and transmission line safety and nuisance must consider possible impacts on the minority/low-income population as part of their analysis. This environmental justice analysis consists of identification of significant impacts (if any), identification of mitigation, and determination of whether there is a disproportionate impact if an unmitigated significant impact has been identified.

Staff are continuing to work with the agencies and the applicant to resolve potential impacts associated with the SSU6 project.

CONCLUSION AND RECOMMENDATIONS

Staff cannot recommend approval of SSU6 at this time due to the need for additional information, or unresolved issues, in air quality, biological, cultural, traffic and transportation, transmission system engineering, visual, waste management, and water and soils technical areas.

Staff will notice and conduct one or more workshops in May of 2003 for the purpose of resolving staff concerns and addressing any comments received on this PSA, prior to release of the completed FSA.

Staff cannot predict the amount of time that will be needed for parties to provide the needed information or for agencies to issue their determinations. For that reason, staff will propose an FSA schedule that is linked to the receipt of the critical information identified in the PSA. Taking into consideration the amount of time necessary for analysis, review, revisions, and document preparation, staff needs a minimum of 30 days after all critical pieces of information and final determinations from the relevant agencies are received to complete the FSA.

**SALTON SEA UNIT 6 PROJECT
(02-AFC-2)
PRELIMINARY STAFF ASSESSMENT**

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INTRODUCTION

PURPOSE OF THIS REPORT

The Preliminary Staff Assessment (PSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the CE Obsidian Energy, LLC Application for Certification (AFC) to construct and operate the Salton Sea Unit 6 geothermal power plant project. This PSA is a staff document. It is neither a Committee document, nor a draft decision. The PSA describes the following:

- the existing environmental setting;
- the proposed project;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- cumulative analysis of the potential impacts of the project, along with potential impacts from other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies and intervenors that may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified;
- project alternatives; and
- project closure requirements.

The analyses contained in this PSA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. and Title 20, California Code of Regulation section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).

ORGANIZATION OF THE STAFF ASSESSMENT

The PSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 19 technical areas. Each technical area is addressed in a separate chapter. They include the following: air quality, public health, worker safety and fire protection, transmission line safety, hazardous material management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soil and water resources, geological and paleontological resources, facility design, power plant reliability, power plant efficiency, and transmission system engineering. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

Each of the 19 technical area assessments includes a discussion of:

- laws, ordinances, regulations and standards (LORS);
- the regional and site-specific setting;
- project specific and cumulative impacts;
- mitigation measures;
- closure requirements;
- conclusions and recommendations; and
- conditions of certification for both construction and operation (if applicable).

ENERGY COMMISSION SITING PROCESS

The California Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, §25500). The Energy Commission must review power plant AFCs to assess potential environmental and public health and safety impacts, potential measures to mitigate those impacts (Pub. Resources Code, §25519), and compliance with applicable governmental laws and standards (Pub. Resources Code, §25523 (d)).

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether the list of environmental impacts it contains is complete, and whether additional or more effective mitigation measures are necessary, feasible and available (Cal. Code Regs., tit. 20, §§ 1742 and 1742.5(a)). Staff's independent review is presented in this report (Cal. Code Regs., tit. 20, §1742.5).

In addition, staff must assess the completeness and adequacy of the health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, § 1743(b)). Staff is required to coordinate with other agencies to ensure that applicable

laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, § 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act. No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the Resources Agency (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)). The Energy Commission acts in the role of the CEQA lead agency and is subject to all other applicable portions of CEQA.

Staff typically prepares both a preliminary and final staff assessment. The Preliminary Staff Assessment (PSA) presents for the applicant, intervenors, agencies, other interested parties and members of the public, the staff's preliminary analysis, conclusions, and recommendations.

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and the Final Staff Assessment (FSA), staff will conduct one or more workshops in the project area (Calipatria or El Centro) to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff will refine their analysis, correct errors, and finalize conditions of certification to reflect areas where staff has reached agreement with the parties. This refined analysis, along with responses to written comments on the PSA, will be published in the FSA. The FSA serves as staff's testimony on a proposal.

This staff assessment is only one piece of evidence that will be considered by the Committee (two Commissioners who have been assigned to this project) in reaching a decision on whether or not to recommend that the full Energy Commission approve the proposed project. At the public hearings, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties, thereby creating a hearing record on which a decision on the project can be based. The hearing before the Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is circulated in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD will be circulated for a comment period to be determined by the Committee. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any intervenor may request that the Energy Commission reconsider its decision.

A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the FSA and other evidence presented at the hearings. The Compliance Monitoring Plan and General Conditions will be presented in the PMPD.

Commission staff's implementation of the plan ensures that a certified facility is constructed, operated, and closed in compliance with the conditions adopted by the Energy Commission. Staff's proposed description of the contents of the Compliance Monitoring Plan and proposed General Conditions are included in the **GENERAL CONDITIONS** section of this PSA.

Agency Coordination

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, the Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, California Department of Fish and Game, and the California Air Resources Board.

For geothermal power projects the Energy Commission evaluates and certifies all aspects of the project except for geothermal production and injection wells that are permitted by the Department of Conservation, Division of Oil Gas and Geothermal Resources (DOGGR), and the well pads and brine pipelines permitted by Imperial County (Pub. Resources Code, § 25120). Both agencies intend to use the Energy Commission's Final Staff Assessment as the CEQA document for their actions.

PROJECT DESCRIPTION

Robert Worl

INTRODUCTION

On July 29, 2002 CE Obsidian Energy, LLC (CEOE) filed an Application for Certification (AFC) with the California Energy Commission seeking approval to construct and operate the Salton Sea Unit #6 (SSU6) project, a 185 megawatt (MW) net output geothermal steam powered electric generation facility. On September 25, 2002, the Energy Commission found the application to be data adequate, initiating staff's independent analysis of the proposed project.

The SSU6 project has elements unique to a geothermal project including a geothermal Resource Production Facility (RPF), geothermal-steam Power Generation Facility (PGF), production and injection wells and pads, above-ground brine pipelines, a brine waste solids handling system, and unique emissions characteristics. The project area, located near the southeast shore of the Salton Sea, is within the unincorporated area of Imperial County, California. The SSU6 Project will be owned by CEOE and operated by an affiliated company. The electric transmission lines will be owned and operated by the Imperial Irrigation District (IID).

The SSU6 includes a high efficiency condensing steam turbine with a net plant output of 185 MW with corresponding brine production rate of 12,815 kph. Normally, the facility will be operated in a base load mode: 8,000 hours per year or more. The renewable energy project is designed to supply capacity and energy to California's electric market, with over 85 percent of the plant output contracted to the IID for a 20 year period following project completion. The remaining energy will either be sold to the California Independent System Operator (ISO) or contracted to third parties via the IID (CEOE 2002a, AFC § 3.1).

GEOHERMAL POWER PROJECT PERMITTING

Geothermal power project permitting varies from that of other thermal power plants. The Energy Commission conducts an environmental analysis of the project as a whole and permits all but the geothermal wells, pads and pipelines, which are subject to permitting by other agencies (Public Resources Code (PRC) § 25120). Both the production and injection wells are permitted by the Department of Conservation, Division of Oil, Gas, and Geothermal Resources. The well pads and the brine pipelines are permitted by Imperial County. Both agencies intend to use the Energy Commission's Final Staff Assessment as the CEQA document for their actions.

Geothermal projects may be subject to a lengthy Notice of Intent (NOI) process which can be avoided by providing evidence of commercial quantities of geothermal resources for the proposed project's life (PRC section 25140.2(a); and Title 20, Calif. Code of Regs., section 1804 (a)). A hearing was held November 19, 2002 and the assigned Committee issued an Order on Geothermal Resource Availability on January 17, 2003. The Committee stated that the project was exempt from the NOI process, and that "there are commercial quantities of geothermal resources...for the operation of the project for its planned lifetime" (CEC 2003b).

SALTON SEA UNIT 6 PROJECT

The SSU6 Project site is in the Imperial Valley, approximately 1,000 feet southeast of the southern reach of the Salton Sea, within the unincorporated area of Imperial County, California. The Imperial Valley is the southwest part of the Colorado Desert that merges northwestward into the Coachella Valley near the northern shore of the Salton Sea. The region is characterized by agriculture and geothermal power production. The town of Niland is approximately 7.5 miles to the northeast and the town of Calipatria is approximately 6.1 miles to the southeast of the plant site. The Sonny Bono Salton Sea Wildlife Refuge Headquarters is approximately 4,000 feet from the plant site. The Alamo River and New River are approximately 4.8 miles southwest and 2.7 miles east of the plant site, respectively. **PROJECT DESCRIPTION Figure 1** shows the regional setting for the proposed project.

The proposed power plant would be located on approximately 80 acres (Plant Site) of a 160-acre parcel owned by the applicant. The plant site will be located on the north half of the block bounded by McKendry Road to the north, Severe Road to the west, Peterson Road to the south, and Boyle Road to the east. The construction area, including laydown and parking, is approximately 24 acres and will be located immediately adjacent and south of the plant site. The plant site, construction laydown and parking areas are currently agricultural land. **PROJECT DESCRIPTION Figure 2** provides the local setting for the proposed project and depicts the project site, including proposed geothermal wells and pads, brine pipelines and electric transmission lines. Nine currently operating geothermal power plants are within a 2-mile radius of the proposed plant site, and are also shown on **PROJECT DESCRIPTION Figure 2**.

SALTON SEA KNOWN GEOTHERMAL RESOURCE AREA

The Salton Sea and the area containing the project are within the 3,100-square-mile structural depression known as the Salton Trough. The Salton Trough is a seismically-active rift valley where sedimentation and natural tectonic subsidence are nearly in equilibrium. Distinct geothermal anomalies are distributed throughout the Salton Trough with brine temperatures sufficient to support electric generation are accessible. Oil and gas exploration of the area in 1958 is credited with discovery of the Salton Sea field, an area including 161 square miles and 102,887 acres. (See **PROJECT DESCRIPTION Figure 1**). This area is designated as the Salton Sea Known Geothermal Resource Area (KGRA) by the United States Geological Survey:

"A KGRA is an area in which the geology, nearby discoveries, competitive interests, or other indicators would, in the opinion of the Secretary of the Interior, engender a belief in those who are experienced in the subject matter that the prospects for extraction of geothermal steam or associated geothermal resources are good enough to warrant expenditures of money for that purpose (30 U.S.C. 1001)." (CEOE 2002a, AFC §3.2.1).

SITE SELECTION

Successful commercial development of the Obsidian Butte region of the KGRA began in 1982 and there are now nine operating power plants producing 350 gross MW, on 4,808 acres. These plants vary in production capacity from 10 MW to 49.8 MW. The SSU6 project will develop an additional 3,180 acres and produce an additional 185 net MW (CEOE 2002a, AFC § 3, Table 3.2-1, p. 3-49).

Geophysical dynamics of the KGRA have a determining influence on the siting of energy projects. Experience and reservoir data from the earlier explorations, plant developments, and recent exploratory drilling were crucial in deciding the location of SSU6. The project site is located along a geologic main blind fault that bisects the Obsidian Butte area in a west-southwest to east-northeast direction. Reservoir temperatures increase to the northwest of this fault with the hottest area under the Salton Sea. Production wellhead temperatures will be from 450-480 degrees Fahrenheit, while injection temperatures are expected to be 230-240 degrees Fahrenheit. The features of this fault structure allow the existing power plants, and SSU6, to maximize the use of the geothermal resource through strategic placement of production and injection wells north of this fault. The blind fault allows injection of cooler steam-depleted brine on the opposite side of the fault from production wells, eliminating the short-term impacts from the cooled, spent brines on the hot production brines and maximizing the production life of the field.

The KGRA and geothermal development are recognized in the Imperial County General Plan's Geothermal and Transmission Element. The project site lies within the plan's heavy agriculture zone with a geothermal overlay zone (Imperial County Planning/Building Department 1993).

PROJECT COMPONENTS

The Salton Sea geothermal power plants rely upon steam extracted from geothermal brine brought to the plant sites through production wells strategically drilled to maximize

use of the resource, without depleting or reducing the natural pressures from the field. To accomplish this specialized facilities are needed to extract the necessary steam at appropriate pressures for turbine operation, and then return the spent brine back to the subsurface resource. The process involves conditioning the steam for turbine use, utilizing condensed and cooled water from the process for cooling, and conditioning the residual brine for reinjection to the field at selected locations. The SSU6 will accomplish these tasks utilizing the following described project components, depicted in **PROJECT DESCRIPTION Figure 2** and **PROJECT DESCRIPTION Figure 3**:

The project plans to use an average of 293 acre-feet per year of fresh water primarily for dilution of the processed brine prior to re-injection.

Resource Processing Facility (RPF)

The RPF extracts geothermal brine, produces steam to power the turbine, and reinjects the spent and reconditioned brine back into the formation. This is accomplished through the 10 production wells, and the seven brine injection wells. Brine is carried through specialized raised pipelines from the production wellheads and back to the injection wellheads. Two plant injection wells also are part of the RPF, one for injecting for injecting cooling tower blow-down, and the other for use in reinjecting aerated brine accumulated in the brine pond.

A brine/steam handling system will extract high pressure (300 psi), standard pressure (120 psi), and low pressure (20 psi) steam, by passing the steam through separators, crystallizers to extract dissolved solids, scrubbers and demisters to clean and condition the steam for turbine use. A similar process train is employed for each of the operating pressure steam streams. All heat-depleted brine then flows through an additional flash system to reduce pressure to near-atmospheric pressure, and then through a clarifier system and a solids dewatering system, conditioning the brine, removing suspended solids, adding treated water to control brine quality, and then sending the cooler depleted brines back to the injection well system (CEOE 2002a, AFC § 3.3.2, pps. 3-7 to 3-10).

Power Generation Facility (PGF)

The PGF facilities include the turbine generator system, heat rejection system, H₂S abatement/carbon adsorber system and two cooling towers, each with 10 cells. The three-pressure turbine is direct-coupled to a totally enclosed water and air cooled synchronous-type generator with a nominal (gross) rating of 200 MW, with the plant parasitic load reducing output to a net 185 MW (CEOE 2002a, AFC § 3.3.3, pps. 3-12, and 3-13).

Wells And Well Pads

There will be 10 production wells on five production well pads each connected by above-ground pipelines to the RPF. These wells and pads are located very close to the main facility and the combined length of production pipelines will be approximately one mile. Seven new injection wells located on three injection well pads will be connected to the RPF by approximately three miles of pipelines. The eight new production and

injection well pads will average 5.2 acres in size (CEOE 2002a, AFC §§ 3.2.2.1, 3.3.1.3, 3.3.2.1, 3.3.2.4.2, and 3.3.2.4.3).

Linear Facilities

Production pipelines will conduct hot brine from the well heads to the RPF, and injection pipelines will return conditioned, depleted brine to the injection wells. Total pipeline length will be approximately four miles, and will consist of 24 or 30-inch pipe elevated to approximately three feet above grade (CEOE 2002a, AFC §§ 3.2.2.1, 3.3.1.3, 3.3.2.1, 3.3.2.4.2, and 3.3.2.4.3).

Fresh water for the project will be IID canal water delivered through a 500-foot buried pipe from the Vail 4A lateral to the service water pond. The water is then used primarily for dilution of geothermal brine prior to reinjection and for potable use after treatment in an on-site reverse osmosis (RO) unit. Projected average use is approximately 293 acre-feet per year (CEOE 2002a, AFC § 3.3.4.2, 3.3.4.2.1, 3.3.4.2.3, 3.3.4.2.4; CEOE. Extreme hot summer conditions, occurring approximately 5 days per year, could require some canal water be used to augment water condensed from steam extraction for plant cooling (CEOE 2002I, p. 62).

Two electric transmission interconnection lines are planned totaling 31 miles of new double-circuit 161 kV line. **PROJECT DESCRIPTION Figure 4** shows the full length and routes of the proposed transmission lines. One line will interconnect at the IID Midway substation 15-miles to the east of the site, and another will interconnect with the existing IID L-line approximately 16 miles southwest. The L-line interconnection will loop into the existing L-line via a new switchyard located on Bannister Road, approximately twelve miles from the project site (CEOE 2003b). This interconnection will then cross Bureau of Land Management (BLM) land requiring approval of the route through amendment to the California Desert Conservation Area Plan (CDCA) (CEOE 2002a, AFC § 5.8.1.2.1. An approximately seven and one half-mile alternate route paralleling State Highway 86 and interconnecting with the L-line after it leaves the BLM lands, is also proposed should the CDCA amendment process prove unsuccessful. The IID has denoted several of its main transmission lines by letter designations. The L-line is an existing line connecting the Avenue 58 and El Centro substations (CEOE 2002a, AFC § 3.3.6.2).

PROJECT CONSTRUCTION SCHEDULE

The overall project schedule is expected to take at least 26 months. Construction and startup of the power plant from the start of site mobilization to commercial operation is expected to take at least 20 months. The construction timeframe if approved under the current CEC review schedule is expected to begin in late 2003 and end during 2006. The construction schedule is based upon a single-shift, eight-hour workday, and a five-day workweek (CEOE 2002a, AFC §3.4.1.1, and .AFC Table 3.4-1).

FACILITY CLOSURE

The Salton Sea Unit 6 plant will be designed for an operating life of 30 years. If the plant were economically viable at the end of this 30-year period, and the equipment is

maintained to industry standards, the plants life could be extended beyond this timeframe. But at some point in the future, the project will cease operation and close down. At that time, it will be necessary to insure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

Although the setting for this project does not appear to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made which provide the flexibility to deal with the specific situation and project setting at the time of closure. LORS pertaining to the facility closure are identified in the technical sections of this assessment. Facility closure will be consistent with laws, ordinances, regulations and standards in effect at the time of closure (CEOE 2002a, AFC § 3.6).

REFERENCES

CEOE (CE Obsidian Energy LLC, Calipatria, California) 2002a. Application for Certification, Volumes I & 2. Submitted to the California Energy Commission on July 29, 2002.

CEOE (CE Obsidian Energy LLC, Calipatria, California) 2002I, Responses to California Energy Commission Data Requests, Set 1. December 2, 2002.

CEOE (CE Obsidian Energy LLC, Calipatria, California) 2003b. Clarifying a Project Change to a switching station at Bannister Rd., and eliminating the proposed substation adjacent to the project site. January 7, 2003.

CEC (California Energy Commission) 2003b. Order on Geothermal Resource Availability. Committee Order, January 17, 2003.

Imperial County Planning/Building Department 1993. Imperial County General Plan, Geothermal and Transmission Element.

PROJECT DESCRIPTION FIGURE 1

PROJECT DESCRIPTION FIGURE 2

PROJECT DESCRIPTION FIGURE 3

PROJECT DESCRIPTION FIGURE 4

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Lisa Blewitt and William Walters

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to the proposed geothermal Resource Production Facility (RPF) merchant class geothermal-powered Power Generation Facility (PGF), and other systems associated with the Salton Sea Unit 6 (SSU6) Project. The SSU6 project is to be located in the Imperial Valley, southeast of the Salton Sea, in an unincorporated area of Imperial County, as proposed by CE Obsidian Energy LLC. Criteria air pollutants are those for which a federal or state ambient air quality standard has been established to protect public health. They include ozone (O₃), nitrogen dioxide (NO₂), carbon monoxide (CO), sulfur dioxide (SO₂), volatile organic compounds (VOC), and particulate matter less than 10 microns in diameter (PM₁₀).

In carrying out the analysis, the California Energy Commission staff evaluated the following major points:

- whether the proposed Salton Sea Unit 6 Project is likely to conform with applicable Federal, State and Imperial County Air Pollution Control District (ICAPCD) air quality laws, ordinances, regulations and standards (LORS), as required by Title 20, California Code of Regulations, section 1742.5 (b);
- whether the Salton Sea Unit 6 Project is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, California Code of Regulations, section 1742 (b); and
- whether the mitigation proposed for the Salton Sea Unit 6 Project is adequate to lessen the potential impacts to a level of insignificance, as required by Title 20, California Code of Regulations, section 1744 (b).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

The federal Clean Air Act requires any new major stationary sources of air pollution and any major modifications to existing major stationary sources to obtain a construction permit before commencing construction. This process is known as New Source Review (NSR). Its requirements differ depending on the attainment status of the area where the major facility is to be located. Prevention of Significant Deterioration (PSD) requirements apply in areas that are in attainment of the national ambient air quality standards (NAAQS). The non-attainment area NSR requirements apply to areas that have not been able to demonstrate compliance with the NAAQS. The entire program, including both PSD and non-attainment NSR permit reviews, is referred to as the federal NSR program.

The U.S. Environmental Protection Agency (EPA) has reviewed and approved the Imperial County Air Pollution Control District's (ICAPCD or District) regulations and has delegated to the District the implementation of the federal non-attainment NSR, Title IV,

and Title V programs. The ICAPCD implements these programs through its own rules and regulations, which are, at a minimum, as stringent as the federal regulations. EPA has not delegated the PSD permitting program to ICAPCD; however, the SSU6 project emissions are below the regulatory thresholds that trigger the need for a PSD permit.

Title V of the federal Clean Air Act requires states to implement and administer an operating permit program to ensure that large sources operate in compliance with the requirements included in the Code of Federal Regulations, Title 40, Part 70. A Title V permit contains all of the requirements specified in different air quality regulations that affect an individual project. The Title V program is administered by ICAPCD under Regulation IX (Rule 900). The project emissions, as shown in Air Quality Table 15, are below the regulatory thresholds (100 tons/yr for any criteria pollutant and 10 tons/year for any hazardous air pollutant (HAP or 25 tons for all HAPs combined), and the project is not defined as one of the source categories (specified in District Rule 900 C.1) that trigger the need for a Title V permit.

Enforcement of the federal New Source Performance Standards (NSPS) has been delegated to the ICAPCD and the corresponding regulations are incorporated into the District's Regulation XI (Rule 1101). For power plants, this regulation applies to those plants with gas turbines and steam generating units. Since the SSU6 Project is a geothermal plant, this regulation does not apply.

The EPA has delegated its non-attainment New Source Review (NSR) permitting authority to the ICAPCD. This delegation is only done for air districts that are able to demonstrate to the satisfaction of EPA that their regulatory programs are at least as stringent as the federal PSD and non-attainment NSR programs. The ICAPCD will issue a Determination of Compliance, which is equivalent to an Authority to Construct (ATC), and will only issue a Permit to Operate after this project secures a license from the California Energy Commission. This permit will be equivalent to a federal non-attainment NSR permits.

Title IV of the federal Clean Air Act provides for the issuance of acid rain permits and requires subject facilities to obtain emission allowances for SO_x emissions. The Title IV program is administered by ICAPCD under Regulation IX (Rule 901). The project is not a fossil fuel fired generating unit as defined by 40 CFR Part 72 and is therefore not subject to Title IV regulation.

STATE

California State Health and Safety Code, Section 41700, requires that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property."

LOCAL

As part of the Energy Commission's licensing process, in lieu of issuing a construction permit to the applicant for the Salton Sea Unit 6 Project, the ICAPCD has prepared and presented to the Commission a Preliminary Review (Preliminary Determination of Compliance (PDOC) equivalent (ICAPCD 2003a). The PDOC evaluates whether and under what conditions the proposed project will comply with the District's applicable rules and regulations, as described below.

Regulation I - General

Rule 109 — Source Sampling

This rule outlines the facilities required for source sampling.

Rule 111 — Equipment Breakdown

This rule defines equipment breakdown and details the requirements necessary in the case of an equipment breakdown situation.

Regulation II — Permits

This regulation sets forth the regulatory framework of the application for and issuance of construction and operation permits for new, altered and existing equipment.

Rule 201 — Permits Required

This rule identifies the types of permits required. A permit to operate is required for the project. An application has been submitted to ICAPCD.

Rule 207 — New and Modified Stationary Source Review

This rule outlines the emissions standards, the offset requirements and conditions, the procedure for calculation of offsets and air quality impact analysis. The specific applicable requirements of this rule are as follows:

C.1 Best Available Control Technology

Best Available Control Technology is required for any new emissions unit that has a potential to emit of 25 lbs/day or more of any non-attainment pollutant or its precursors. Rule 101 lists hydrocarbons and nitrogen oxides as ozone precursors; and, hydrocarbons, nitrogen oxides and sulfur oxides as precursors to PM10, the air basins two non-attainment pollutants. The regulations do not specify ammonia as a regulated non-attainment pollutant.

Additionally, Best Available Control Technology is required for any new emissions unit that has a potential to emit 55 lbs/day or more of hydrogen sulfide.

C.2 Offset Requirements

Offsets are required for new stationary sources with a daily potential to emit for reactive organic compounds, nitrogen oxides, sulfur oxides, PM10 or carbon monoxide that exceed 137 lbs/day.

C.3 Location of Offsets and Offset Ratios

This regulation notes that emission increases subject to offset requirements must be offset at a ratio of 1.2 to 1 when using emission reductions within 50 miles of the source being offset. The APCO will determine the offset ratio when emission reductions are within the air basin but greater than 50 miles from the source, where the minimum ratio that can be determined is 1.2:1 and the maximum ratio is 3:1.

C.5 Additional Source Requirements

Section C.5.b.1 notes that "Emissions from a new or modified Emissions Unit shall not cause or make worse a violation of an Ambient Air Quality Standard". And that "In making this determination the Air Pollution Control Officer shall take into account the increases in minor and secondary source emissions as well as the mitigation of emissions through Offsets obtained pursuant to this regulation.

Section C.5.b.2 allows new or modified Emission Units to be exempted from the Requirements of Section C.5.b.2 at the discretion of the Air Pollution Control Officer provided: 1) offsets have been provided for all increases in permitted emissions including fugitive, cargo carrier, and Secondary Emissions, or 2) if the Emissions Unit is not subject to the Best Available Control Technology and Offset requirements of this Rule.

Section C.5.c requires that the owner or operator of the proposed new Emission Unit demonstrate that all Stationary Sources owned and operated within the state of California are in compliance or a schedule for compliance with all applicable emission limitations and standards.

D.9 Power Plants

This section provides the permit review requirements for power plants for which an Application for Certification has been accepted by the California Energy Commission.

F. Air Quality Impact Analysis

This section specifies the requirements for performing an air quality impact analysis, if required by the Air Pollution Control Officer.

Regulation III — Fees

Rule 309 – Air Toxic “Hot Spots” Information and Assessment

Facilities are subject to an annual fee to recover the reasonable anticipated costs incurred by the State Air Resources Board, the District, and the State Department of Health Services in implementing and administering the Air Toxic "Hot Spots" information and Assessment Act.

Regulation IV - Prohibitions

This regulation sets forth the restrictions for visible emissions, odor nuisance, various air emissions, and fuel contaminants.

Rule 400 – Fuel Burning Equipment – Oxides of Nitrogen

This rule applies to nitrogen oxides emissions from new and existing stationary fuel burning equipment. The discharge limit of nitrogen oxides is 140 lb/hr (NO₂). Compliance demonstration, including test methods and reporting requirements is provided.

Rule 401 – Opacity of Emissions

This rule restricts visible emissions from a single source for more than three minutes in any one hour from being as dark or darker than that designated No. 1 on the Ringelmann Chart (US Bureau of Mines) or less than 20% opacity.

Rule 403 – General Limitations on the Discharge of Air Contaminants

This rule applies to emissions from any single unit; and restricts the discharge of particulate matter, including lead and lead compounds, air contaminants, and combustion contaminants. Test methods and limits are provided.

Rule 405 – Sulfur Compounds Emission Standards, Limitations and Prohibitions

This rule applies to emissions of sulfur compounds from any single source of emissions. A limit of 0.2 percent by volume (SO₂) is specified for sulfur compounds. Stationary fuel burning equipment limits are specified at 500 parts per million by volume (SO₂), or 200 lb/hr of sulfur compounds (SO₂). The sulfur content limit of fuels are specified at 50 grains per 100 cubic feet of gaseous fuel, calculated as H₂S at standard conditions, or 0.5 percent by weight.

Rule 407 — Nuisance

This rule restricts the discharge of any contaminant in quantities that cause or have a natural ability to cause injury, damage, nuisance or annoyance to businesses, property or the public.

Regulation VIII

Rule 800 - Fugitive Dust Requirement for Control of Fine Particulate Matter (PM-10)

This rule requires that the applicant prevent, reduce or mitigate fugitive dust emissions from the project site by implementing and maintaining EPA defined Reasonably Available Control Measures (RACM), unless the implementation of such RACM endangers or could endanger the health or safety of the public. A list of RACM is provided in the rule. Details are provided for track out/carry out, unpaved haul/access roads, unpaved roads, bulk material handling, material transport, and haul trucks.

SETTING

METEOROLOGICAL CONDITIONS

The SSU6 Project site is located in the Imperial Valley, just beyond the southeast shoreline of the Salton Sea. Imperial Valley is the southwest part of the Colorado Desert that merges northwestward into the Coachella Valley near the northern shore of

the Salton Sea. The immediate area surrounding the project site is dominated by agriculture, geothermal power plants and the Salton Sea, including Salton Sea wildlife habitat areas.

Imperial County is classified as having a desert climate, characterized by low precipitation, hot summers and mild winters. The coastal mountains on the western edge of the Imperial Valley block the cool, damp marine air found in the California coast, which results in low relative humidity conditions. The flat terrain of the valley floor in the Salton Sea area and the strong temperature differentials created by intense solar heating produce moderate winds and deep thermal convection currents. The valley area experiences surface inversions virtually every day of the year that are usually broken by solar heating. Air stagnation conditions can occur for a day or for a few days during the presence of a Pacific high-pressure system.

Temperature and precipitation data from the nearest representative local cooperative station, Brawley 2 SW, indicates that July is the hottest month with an average maximum temperature of 106.5°F, an average minimum temperature of 74.4°F, and an average mean temperature of 90.5°F. January is the coldest month with an average maximum temperature of 69.3°F, an average minimum temperature of 35.7°F, and an average mean temperature of 54.0°F. Annual average rainfall is 3.05 inches. December receives the most rain, averaging 0.41 inches; June receives the least, averaging 0.01 inches. Monthly average wind speeds in the region range from 6.6 miles per hour (mph) in October to 9.5 mph in July. Winds average 7.8 mph annually. Winds in the valley are primarily from the west to east throughout the year, but have a secondary southeast component in the fall. High winds, some that can create dust storms, are occasionally experienced in the Imperial Valley region. Solar isolation data suggests that 90 percent of possible sunshine occurs in the region. The cloudiest periods occurs in winter while the sunniest periods are in the summer.

Available temperature and rainfall data from Imperial essentially mirrors the Brawley data with nearly identical temperature data and average rainfall, but shows that January is the month with the greatest rainfall, averaging 0.50 inches. Rainfall in Imperial County is highly variable, with the rainfall from single heavy storms exceeding the entire rainfall totals of other dryer years.

Wind movements based on Imperial County Airport data for the period 1995-1999 show an average wind speed of 7.6 miles per hour, and in general, the winds predominantly from the west to southwest.

Wind movements based on Niland monitoring station data for 2002 show an average wind speed of 6.9 miles per hour and show that winds predominately are from the southeast with another large component from the west. The winds from the southeast generally show low wind speeds while the winds from the west show comparatively higher wind speeds.

Other meteorological data collected from other sources in and around the Salton Sea show different wind speed and direction patterns. Staff believes that the Salton Sea creates a microclimate that effects the meteorological conditions surrounding the sea,

which creates the potential for significant variability in the specific meteorological conditions at different sites surrounding the sea.

EXISTING AIR QUALITY

The EPA and the California Air Resources Board (CARB) both authorized to establish allowable maximum ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by CARB, are typically more restrictive than the federal AAQS, which are established by the EPA. The state and federal air quality standards are listed in **AIR QUALITY Table 1**. As indicated in Table 1, the averaging times for the various air quality standards (the duration over which they are measured) range from one-hour to an annual basis. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant per cubic meter of air (mg/m^3 and $\mu\text{g}/\text{m}^3$, respectively).

In general, an area is designated as attainment for a specific pollutant if the concentrations of that air contaminant do not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that standard is violated. Where not enough ambient data are available to support designation as either attainment or non-attainment, the area would be designated as unclassified. Unclassified areas are normally treated the same as attainment areas for regulatory purposes. An area can be attainment for one air contaminant and non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same contaminant. The entire area within the boundaries of a district or air basin is usually evaluated to determine the district's attainment status. **AIR QUALITY Table 2** shows the area designation status of the Salton Sea air basin for each criteria pollutant for both the federal and state ambient air quality standards. The federal classifications range from moderate to extreme.

AIR QUALITY Table 1
Federal and State Ambient Air Quality Standards

| Pollutant | Averaging Time | Federal Standard | California Standard |
|--|------------------------|------------------------------------|---|
| Ozone (O ₃) | 1 Hour | 0.12 ppm (235 µg/m ³) | 0.09 ppm (180 µg/m ³) |
| | 8 Hour | 0.08 ppm (160 µg/m ³) | — |
| Carbon Monoxide (CO) | 8 Hour | 9 ppm (10 mg/m ³) | 9 ppm (10 mg/m ³) |
| | 1 Hour | 35 ppm (40 mg/m ³) | 20 ppm (23 mg/m ³) |
| Nitrogen Dioxide (NO ₂) | Annual Average | 0.053 ppm (100 µg/m ³) | — |
| | 1 Hour | — | 0.25 ppm (470 µg/m ³) |
| Sulfur Dioxide (SO ₂) | Annual Average | 0.03 ppm (80 µg/m ³) | — |
| | 24 Hour | 0.14 ppm (365 µg/m ³) | 0.04 ppm (105 µg/m ³) |
| | 3 Hour | 0.5 ppm (1300 µg/m ³) | — |
| | 1 Hour | — | 0.25 ppm (655 µg/m ³) |
| Respirable Particulate Matter (PM ₁₀) ^a | Annual Geometric Mean | — | 30 µg/m ³ |
| | 24 Hour | 150 µg/m ³ | 50 µg/m ³ |
| | Annual Arithmetic Mean | 50 µg/m ³ | — |
| Fine Particulate Matter (PM _{2.5}) ^a | Annual Arithmetic Mean | 15 µg/m ³ | — |
| | 24 Hour | 65 µg/m ³ | — |
| Sulfates (SO ₄) | 24 Hour | — | 25 µg/m ³ |
| Lead | 30 Day Average | — | 1.5 µg/m ³ |
| | Calendar Quarter | 1.5 µg/m ³ | — |
| Hydrogen Sulfide (H ₂ S) | 1 Hour | — | 0.03 ppm (42 µg/m ³) |
| Vinyl Chloride (chloroethene) | 24 Hour | — | 0.010 ppm (26 µg/m ³) |
| Visibility Reducing Particulates | 1 Observation (8 hour) | — | Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. |

Note(s):

- a. The State of California is currently in the process of revising its annual PM₁₀ ambient air quality standard and in the process of enacting PM_{2.5} ambient air quality standards. The following standards were adopted by the Air Resources Board on June 20, 2002, but submission to, and final approval by, the Office of Administrative Law has not yet occurred.

PM₁₀ – 20 ug/m³ (annual standard - arithmetic mean)

PM_{2.5} – 12 ug/m³ (annual standard - arithmetic mean)

AIR QUALITY Table 2
Federal and State Attainment Status for the Salton Sea Air Basin

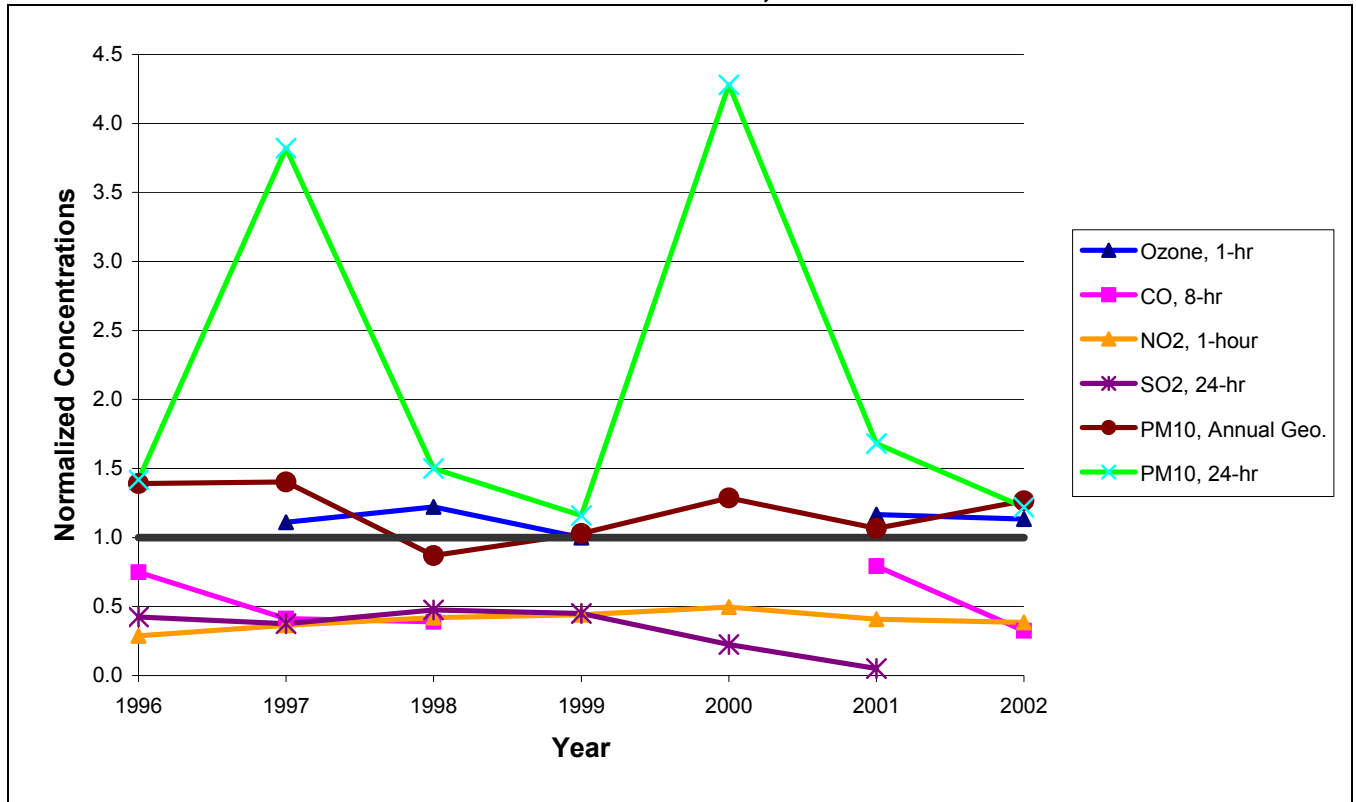
| Pollutants | Federal Classification | State Classification |
|------------------|--|-------------------------|
| Ozone | Transitional Non-Attainment ^a | Moderate Non-Attainment |
| PM ₁₀ | Moderate Non-Attainment ^b | Non-Attainment |
| CO | Attainment | Attainment |
| NO ₂ | Attainment | Attainment |
| SO ₂ | Attainment | Attainment |
| H ₂ S | --- | Attainment/Unclassified |

Note(s):

- a. Clean Air Act Section 185A (Previously called Transitional) areas were designated as an ozone nonattainment area as of the date of enactment of the Clean Air Act Amendments of 1990, and have not violated the national primary ambient air quality standard for ozone for the 36-month period commencing on January 1, 1987, and ending on December 31, 1989. Twelve areas were classified transitional in 1991. Prior Designation retained by operation of Law, but without measured violations.
- b. Currently, the area is officially still a moderate non-attainment area even though available data suggests the area would attain standards except for the influence of sources outside the U.S. For the U.S. EPA to reclassify Imperial County as being in attainment, Imperial County must request reclassification to attainment.

In **AIR QUALITY Figure 1**, the short term normalized concentrations based on data collected from various air monitoring stations are provided from 1996 to 2002 for ozone, CO, NO₂, PM₁₀, and SO₂. Air monitoring station data for ozone and PM₁₀ are from Niland-English Road, CO data are from El Centro-9th Street, NO₂ data are from Calexico-East and El Centro (2002), and SO₂ data are from Calexico-East. Normalized concentrations represent the ratio of the highest measured concentrations in a given year to the most-stringent applicable national or state ambient air quality standard. Therefore, normalized concentrations lower than one indicate that the measured concentrations were lower than the most-stringent ambient air quality standard.

AIR QUALITY Figure 1
Normalized Maximum Short-Term Historical
Air Pollutant Concentrations, 1996-2002



As shown in **AIR QUALITY Figure 1**, CO, NO₂, and SO₂ are all lower than the most-stringent ambient air quality standards between 1994 and 2001. These pollutants are also classified as in attainment per the National and State Ambient Air Quality Standards. Following is a more in-depth discussion of the ambient air quality conditions in the project area, which are used as the basis for the background concentrations.

Ozone

In the presence of ultraviolet radiation, both NO_x and VOC go through a number of complex chemical reactions to form ozone. NO_x and VOC emissions from vehicles and stationary sources from within the air basin and the migration of pollution from other air basins and Mexico, in conjunction with daytime wind flow patterns, mountain barriers, a persistent temperature inversion and intense sunlight, result in ozone forming conditions in Imperial County. **AIR QUALITY Table 3** summarizes the best representative ambient ozone data collected from three different monitoring stations close to the project site. The table includes the maximum hourly concentration and the number of days above the State standards. The Salton Sea air basin is classified as a transitional nonattainment area for ozone per the National Ambient Air Quality Standards, and a moderate nonattainment area for ozone per the California Ambient Air Quality Standards.

AIR QUALITY Table 3
Ozone Air Quality Summary, 1994-2001

| Year | Niland- English Rd. | | | | Westmorland – West 1 st St. | | | | El Centro – 9 th St. | | | |
|---|---------------------|------------------|-----------------------|--------------------------|--|------------------|-----------------------|--------------------------|---------------------------------|------------------|-----------------------|--------------------------|
| | % Data | Days Above CAAQS | Max. 1-hr Level (ppm) | Month of Max. 1-hr Level | % Data | Days Above CAAQS | Max. 1-hr Level (ppm) | Month of Max. 1-hr Level | % Data | Days Above CAAQS | Max. 1-hr Level (ppm) | Month of Max. 1-hr Level |
| 1994 | --- | --- | --- | --- | --- | --- | --- | --- | 100 | 29 | 0.130 | Mar |
| 1995 | --- | --- | --- | --- | --- | --- | --- | --- | 99 | 31 | 0.150 | Oct |
| 1996 | --- | --- | --- | --- | --- | --- | --- | --- | 84 | 41 | 0.140 | Jun |
| 1997 | 10 | 1 | 0.100 | Oct | --- | --- | --- | --- | 95 | 29 | 0.130 | Jun |
| 1998 | 86 | 5 | 0.110 | Jul | 74 | 10 | 0.120 | Jul | 88 | 12 | 0.130 | Nov |
| 1999 | 40 | 0 | 0.090 | Jan | 27 | 24 | 0.145 | Oct | 37 | 9 | 0.140 | Jan |
| 2000 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2001 | 98 | 2 | 0.105 | Oct | 36 | 1 | 0.105 | Oct | 60 | 13 | 0.135 | Sep |
| 2002 | 99 | 5 | 0.102 | Jun | 99 | 0 | 0.092 | May | 99 | 19 | 0.122 | Mar |
| California Ambient Air Quality Standard (CAAQS): 0.09 ppm National Ambient Air Quality Standard: 0.12 ppm Source: CARB web site, http://www.arb.ca.gov/adam/ , Accessed October 2002. | | | | | | | | | | | | |

The Niland – English Road monitoring station, located only 5.6 miles from the project site, measures the most representative existing ambient air quality data for the proposed project site because of its similar desert-like characteristics and proximity to the proposed project site. The El Centro – 9th Street monitoring station, having the longest data record, suggests that ozone levels may have peaked in the mid 1990's and are now trending toward lower concentrations. The El Centro – 9th Street monitoring station is located 26 miles from the project site.

Carbon Monoxide (CO)

The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. Since mobile sources (motor vehicles) are the main cause of CO, ambient concentrations of CO are highly dependent on motor vehicle activity. In fact, the peak CO concentrations occur during the rush hour traffic in the morning and afternoon. Carbon monoxide concentrations in the state have declined significantly due to two state-wide programs: 1) the 1992 wintertime oxygenated gasoline program, and 2) Phases I and II of the reformulated gasoline program. New vehicles with oxygen sensors and fuel injection systems have also contributed to the decline in CO levels in the state. However, Mexico does not have equivalent programs, which in part cause high CO concentrations near the border, particularly near Mexicali.

CO is considered a local pollutant as it is found in high concentrations only near the source of emission. Though mobile sources are the principal source of CO emissions, high levels can also be generated from fireplaces and wood-burning stoves.

AIR QUALITY Table 4 summarizes the best representative ambient carbon monoxide data collected from three different monitoring stations close to the project site. The

table includes the maximum 1-hour and 8-hour concentrations and the number of days above the State standards. The Salton Sea air basin is classified as an attainment area for CO per the National Ambient Air Quality Standards and the California Ambient Air Quality Standards.

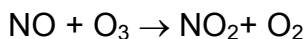
AIR QUALITY Table 4
CO Air Quality Summary, 1994-2001

| Year | El Centro – 9 th St. | | | | Calexico-East | | | | Calexico-Ethel Street | | | |
|---|---------------------------------|-------------------------|-------------------------|-----------------------|---------------|-------------------------|-------------------------|-----------------------|-----------------------|-------------------------|-------------------------|----------------------|
| | % Data | Max. 1-hr Average (ppm) | Max. 8-hr Average (ppm) | Days Above 8-hr CAAQS | % Data | Max. 1-hr Average (ppm) | Max. 8-hr Average (ppm) | Days Above 8-hr CAAQS | % Data | Max. 1-hr Average (ppm) | Max. 8-hr Average (ppm) | Days Above 8-hr CAAQ |
| 1994 | --- | --- | --- | --- | --- | --- | --- | --- | 63 | 30.6 | 13.06 | 10 |
| 1995 | --- | --- | --- | --- | --- | --- | --- | --- | 99 | 32.0 | 22.93 | 17 |
| 1996 | 100 | 12.0 | 6.75 | 0 | 63 | 22.0 | 8.74 | 0 | 100 | 27.0 | 22.1 | 11 |
| 1997 | 100 | 6.0 | 3.71 | 0 | 99 | 21.0 | 16.29 | 4 | 99 | 24.0 | 17.84 | 13 |
| 1998 | 75 | 7.0 | 3.50 | 0 | 95 | 18.4 | 13.0 | 3 | 96 | 23.5 | 14.36 | 10 |
| 1999 | --- | --- | --- | --- | 97 | 14.0 | 9.37 | 1 | 96 | 22.9 | 17.86 | 13 |
| 2000 | --- | --- | --- | --- | 35 | --- | 11.30 | 1 | 96 | --- | 15.47 | 7 |
| 2001 | 76 | --- | 7.14 | 0 | 65 | --- | 6.44 | 0 | 99 | --- | 12.33 | 6 |
| 2002 | 98 | --- | 2.93 | 0 | --- | --- | --- | --- | --- | --- | --- | --- |
| California Ambient Air Quality Standard: 1-hr, 20 ppm; 8-hr, 9 ppm National Ambient Air Quality Standard: 1-hr, 35 ppm; 8-hr, 9 ppm Source: CARB Air Quality Data CD, 2000 and CARB web site, http://www.arb.ca.gov/adam/ , Accessed 2002/2003. | | | | | | | | | | | | |

As **AIR QUALITY Table 4** shows, the maximum one-hour and eight-hour CO concentrations are less than the California Ambient Air Quality Standards at the El Centro – 9th Street air monitoring station since at least 1996 (no data available prior to 1996). This is the closest monitoring station, located 26 miles from the proposed project site, having CO air quality data. The Calexico peak concentration data is not considered to be representative of the project site.

Nitrogen Dioxide (NO₂)

Approximately 90 percent of the NO_x emitted from combustion sources is NO, while the balance is NO₂. NO is oxidized in the atmosphere to NO₂ but some level of photochemical activity is needed for this conversion. This is why the highest concentrations of NO₂ occur during the fall and not in the winter when atmospheric conditions favor the trapping of ground level releases but lack significant photochemical activity (less sunlight). In the summer the conversion rates of NO to NO₂ are high but the relatively high temperatures and windy conditions (atmospheric unstable conditions) disperse pollutants, preventing the accumulation of NO₂ to levels approaching the 1-hour ambient air quality standard. The formation of NO₂ in the summer with the help of the ozone is according to the following reaction.



In urban areas, ozone concentration level is typically high. That level will drop substantially at night as the above reaction takes place between ozone and NO. This reaction explains why, in urban areas, ozone concentrations at ground level drop, while

aloft and in downwind rural areas (without sources of fresh NO_x emissions) ozone concentrations can remain relatively high.

AIR QUALITY Table 5 summarizes the best representative ambient nitrogen dioxide data collected from three different monitoring stations close to the project site. The table includes the maximum 1-hour and annual concentrations. The Salton Sea air basin is classified as an attainment area for NO₂ per the National Ambient Air Quality Standards and the California Ambient Air Quality Standards.

AIR QUALITY Table 5
NO₂ Air Quality Summary, 1994-2001

| Year | El Centro – 9 th Street | | | Calexico-East | | | Calexico-Ethel | | |
|--|------------------------------------|-------------------------|---------------------------|---------------|-------------------------|---------------------------|----------------|-------------------------|---------------------------|
| | % Data | Max. 1-hr Average (ppm) | Max. Annual Average (ppm) | % Data | Max. 1-hr Average (ppm) | Max. Annual Average (ppm) | % Data | Max. 1-hr Average (ppm) | Max. Annual Average (ppm) |
| 1994 | --- | --- | --- | --- | --- | --- | 68 | 0.227 | --- |
| 1995 | --- | --- | --- | --- | --- | --- | 99 | 0.217 | 0.016 |
| 1996 | --- | --- | --- | 65 | 0.072 | --- | 99 | 0.164 | 0.014 |
| 1997 | --- | --- | --- | 95 | 0.091 | 0.011 | 74 | 0.128 | 0.015 |
| 1998 | --- | --- | --- | 91 | 0.105 | 0.012 | 74 | 0.257 | --- |
| 1999 | --- | --- | --- | 98 | 0.110 | 0.013 | 98 | 0.286 | 0.018 |
| 2000 | --- | --- | --- | 76 | 0.124 | 0.012 | 96 | 0.192 | 0.019 |
| 2001 | 47 | 0.086 | --- | 81 | 0.102 | 0.010 | 76 | 0.139 | 0.014 |
| 2002 | 99 | 0.096 | 0.010 | --- | --- | --- | --- | --- | --- |
| California 1-hr Ambient Air Quality Standard: 0.25 ppm | | | | | | | | | |
| National Annual Ambient Air Quality Standard: 0.053 ppm | | | | | | | | | |
| Source: CARB Air Quality Data CD, 2000, and CARB web site, http://www.arb.ca.gov/adam/ , Accessed 2002/2003. | | | | | | | | | |

As shown in **AIR QUALITY Table 5** the maximum one-hour and annual concentrations of NO₂ at the El Centro 9th Street air monitoring station are lower than the California and National Ambient Air Quality Standards. This monitoring station is considered by staff to provide the most representative data for the project site since it is the closest station to the project site. Data from the Calexico-East monitoring station, located 36 miles from the project site, also shows no exceedances of the state 1-hr standard and federal annual standard.

Inhalable Particulate Matter (PM₁₀)

PM₁₀ can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NO_x, SO_x and VOC from turbines, and ammonia from NO_x control equipment, given the right meteorological conditions, can form particulate matter in the form of nitrates (NO₃), sulfates (SO₄), and organic particles. These pollutants are known as secondary particulates, because they are not directly emitted but are formed through complex chemical reactions in the atmosphere.

PM nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid in turn originates from NO_x emissions from combustion sources. The nitrate ion concentrations during the wintertime are a significant portion of the total PM₁₀, and should be even a higher contributor to

particulate matter of less than 2.5 microns ($PM_{2.5}$). The nitrate ion is only a portion of the PM nitrate, which can be in the form of ammonium nitrate (ammonium plus nitrate ions) and some as sodium nitrate. If the ammonium and the sodium ions associated with the nitrate ion are taken into consideration, PM nitrate contributions to the total PM would be even more significant.

The air agencies in California are now deploying $PM_{2.5}$ ambient air quality monitors throughout the state. $PM_{2.5}$ ambient air quality attainment plans, if needed, are due to the EPA by 2005.

AIR QUALITY Table 6 summarizes the most representative ambient PM_{10} data collected from three different monitoring stations close to the project site. The table includes the maximum daily average, annual geometric average and annual arithmetic average concentrations. The Salton Sea air basin is classified as a moderate nonattainment area for PM_{10} per the National Ambient Air Quality Standards, and a nonattainment area for PM_{10} per the California Ambient Air Quality Standards. Initially California was to have attained PM_{10} standards in Imperial County by December 31, 1994. Not meeting the standards by that date would have forced the U.S. EPA to reclassify the area as a severe non-attainment area, except that California demonstrated to the U.S. EPA that standards would have been met except for emissions emanating from outside the U.S. Currently, the area is officially still moderate non-attainment area even with the U.S. EPA's finding of attainment. For the U.S. EPA to reclassify Imperial County as being in attainment, Imperial County must request reclassification to attainment.

AIR QUALITY Table 6
PM₁₀ Air Quality Summary, 1994-2001

| Year | % Data | Days Above CAAQS* (Calc) | Maximum Daily Avg. (µg/m ³) | Month of Maximum Daily Level | Annual Geometric Average | Annual Arithmetic Average |
|--|--------|--------------------------|---|------------------------------|--------------------------|---------------------------|
| Niland – English Rd. | | | | | | |
| 1994 | --- | --- | --- | --- | --- | --- |
| 1995 | --- | --- | --- | --- | --- | --- |
| 1996 | 50 | 36 | 71.0 | Jul | 41.7 | 43.6 |
| 1997 | 52 | 72 | 191.0 | Oct | 42.1 | 46.9 |
| 1998 | 84 | 24 | 75.0 | Jul | 26.1 | 30.2 |
| 1999 | 100 | 42 | 58.0 | Jun | 30.9 | 34.1 |
| 2000 | 94 | 120 | 214.0 | Sep | 38.6 | 48.6 |
| 2001 | 87 | 84 | 84.0 ^a | Apr | 32 | 42 |
| 2002 | --- | 78 | 61.0 | Oct | 38 | 36 |
| Westmorland – West 1 st St. | | | | | | |
| 1994 | 60 | 36 | 120.0 | Aug | 39.5 | 51.5 |
| 1995 | 95 | 78 | 107.0 | Mar | 34.5 | 38.9 |
| 1996 | 99 | 120 | 229.0 | Jul | 42.1 | 49.3 |
| 1997 | 94 | 72 | 213.0 | Oct | 36.4 | 43.5 |
| 1998 | 99 | 54 | 81.0 | Apr | 28.4 | 32.4 |
| 1999 | 100 | 102 | 130.0 | Jul | 40.2 | 44.2 |
| 2000 | 94 | 126 | 250.0 | Sep | 45.2 | 54.1 |
| 2001 | 92 | 155 | 125.0 ^a | Apr | 45 | 57 |
| 2002 | --- | 111 | 56.0 | Oct | 50 | 50 |
| Brawley – Main St. | | | | | | |
| 1994 | 91 | 108 | 126.0 | Mar | 46.5 | 51.9 |
| 1995 | 96 | 108 | 122.0 | Mar | 40.8 | 45.1 |
| 1996 | 100 | 132 | 257.0 | Jul | 41.6 | 47.1 |
| 1997 | 93 | 84 | 532.0 | Oct | 42.2 | 50.7 |
| 1998 | 90 | 54 | 81.0 | Jan | 35.6 | 38.1 |
| 1999 | 93 | 96 | 89.0 | May | 39.3 | 42.1 |
| 2000 | 93 | 114 | 204.0 | Sep | 45.9 | 51.3 |
| 2001 | 93 | 86 | 120.0 | Apr | 39 | 42 |
| 2002 | --- | 60 | 37.0 | Oct | 40 | 38 |
| <p>California Ambient Air Quality Daily Standard: 50 µg/m³ National Ambient Air Quality Daily Standard: 150 µg/m³ California Annual Geometric Mean AAQS: 30 µg/m³ National Annual Arithmetic Mean AAQS: 50 µg/m³ Source: CARB Air Quality Data CD, 2000, and CARB web site, http://www.arb.ca.gov/adam/, Accessed 2002/2003.</p> <p>Note (a): Except for measurements of 377 µg/m³ and 647 µg/m³, and at Niland and Westmorland, respectively, due to high winds throughout the Imperial and Mexicali Valley on August 17, 2001, all of the remaining year's PM₁₀ data show compliance with the NAAQS. The second highest measurements for Niland and Westmorland are shown in this table.</p> <p>* Days above the state standard (calculated): Because PM₁₀ is monitored approximately once every six days, the potential number of violation days is calculated by multiplying the actual number of days of violations by six.</p> | | | | | | |

As **AIR QUALITY Table 6** indicates, the project area annually experiences a number of violations of the state 24-hour PM₁₀ standard. The Niland – English Road monitoring

station, located only 5.6 miles from the project site, is considered the most representative existing ambient air quality data for the proposed project site. PM₁₀ concentrations recorded at Niland-English Road also consistently exceed the 24-hour state standard, although the federal annual PM₁₀ standard was not exceeded between 1996 and 2000.

Fine Particulate Matter (PM_{2.5})

As **AIR QUALITY Table 7** indicates, the 1-year 98th percentile 24-hour average and annual average PM_{2.5} concentration levels have generally been declining at the Brawley – Main Street, El Centro – 9th Street, and Calexico – Ethel Street monitoring stations since at least 1999. These monitoring stations are located approximately 13 miles, 26 miles, and 35 miles, respectively, from the proposed project site. The 3-year 98th percentile 24-hour average concentrations at all three stations have been below the proposed CAAQS of 65 µg/m³ since at least 1999. The 3-year average of annual arithmetic means (national annual average) measured at Brawley – Main Street and El Centro – 9th Street monitoring stations, located closest to the proposed project site, are below the proposed NAAQS of 15 µg/m³. The Salton Sea air basin is influenced by emissions from Mexico, primarily Mexicali, that may in part cause the Calexico monitoring site to exceed the annual ambient standard. Due to the border pollution effect, and its potential interpretation, it is uncertain how the EPA will determine attainment status of the PM_{2.5} standards for the air basin.

AIR QUALITY: Table 7
PM_{2.5} Air Quality Summary, 1999-2001 (µg/m³)

| Year | Brawley – Main St. | | | | |
|---|---------------------------------|--|--|----------------|----------------------|
| | Max. Daily Average | 1-Yr 98 th Percentile of Max. Daily Average | 3-Yr. Avg. 98 th Percentile of Max. Daily Average | Annual Average | 3-Yr. Annual Average |
| 1999 | 44.2 | 43.2 | --- | 11.2 | --- |
| 2000 | 55.4 | 41.5 | --- | 12.3 | --- |
| 2001 | 42.2 | 30.2 | 38.3 | 11.1 | 11.5 |
| 2002 | 22.3 | 17.7 | 29.8 | 10.1 | 11.1 |
| Year | El Centro – 9 th St. | | | | |
| | Max. Daily Average | 1-Yr 98 th Percentile of Max. Daily Average | 3-Yr. Avg. 98 th Percentile of Max. Daily Average | Annual Average | 3-Yr. Annual Average |
| 1999 | 52.5 | 39.5 | --- | 11.8 | --- |
| 2000 | 55.6 | 39.3 | --- | 10.4 | --- |
| 2001 | 23.5 | 17.6 | 32.1 | 8.9 | 10.3 |
| 2002 | 22.5 | 17.4 | 24.8 | 8.8 | 9.4 |
| Year | Calexico – Ethel St. | | | | |
| | Max. Daily Average | 1-Yr 98 th Percentile of Max. Daily Average | 3-Yr. Avg. 98 th Percentile of Max. Daily Average | Annual Average | 3-Yr. Annual Average |
| 1999 | 51.6 | 39.5 | --- | 15.2 | --- |
| 2000 | 84.2 | 56.0 | --- | 16.9 | --- |
| 2001 | 60.2 | 50.4 | 48.6 | 14.9 | 15.7 |
| 2002 | 46.5 | 43.5 | 46.3 | 13.8 | 15.2 |
| Proposed National Ambient Air Quality Standards: 3-Year Average - 98 th Percentile of 24-Hr Avg. Concentrations, 65 µg/m ³ ; 3-Year Average of Annual Arithmetic Mean (National Annual Average), 15 µg/m ³ Source: CARB web site, http://www.arb.ca.gov/adam/ , Accessed 2002/2003. | | | | | |

Sulfur Dioxide (SO₂)

Sulfur dioxide is typically emitted as a result of the combustion of a fuel that contains sulfur. Fuels such as natural gas contain very little sulfur and consequently have very low SO₂ emissions when combusted. By contrast, fuels high in sulfur content such as certain types of coal or heavy fuel oils emit very large amounts of SO₂ when combusted.

The Salton Sea air basin is designated attainment for all the SO₂ state and federal ambient air quality standards. **AIR QUALITY Table 8** shows the historic 1-hour, 24-hour and annual average SO₂ concentrations measured at the Calexico-East and Calexico-Ethel Street monitoring stations. As **AIR QUALITY Table 8** shows, concentrations of SO₂ are far below the state and federal SO₂ ambient air quality standards.

AIR QUALITY Table 8
SO₂ Air Quality Summary, 1994-2000

| Year | Calexico-East | | | | | Calexico-Ethel Street | | | | |
|---|---------------|-------------------------|-------------------------|--------------------------|----------------------|-----------------------|-------------------------|-------------------------|--------------------------|----------------------|
| | % Data | Max. 1-hr Average (ppm) | Max. 3-hr Average (ppm) | Max. 24-hr Average (ppm) | Annual Average (ppm) | % Data | Max. 1-hr Average (ppm) | Max. 3-hr Average (ppm) | Max. 24-hr Average (ppm) | Annual Average (ppm) |
| 1994 | --- | --- | --- | --- | --- | 51 | 0.060 | --- | 0.020 | 0.007 |
| 1995 | --- | --- | --- | --- | --- | 46 | 0.039 | --- | 0.018 | 0.005 |
| 1996 | 66 | 0.036 | 0.020 | 0.010 | 0.0017 | 89 | 0.036 | 0.028 | 0.017 | 0.004 |
| 1997 | 89 | 0.035 | 0.026 | 0.015 | 0.0020 | 83 | 0.040 | 0.031 | 0.015 | 0.003 |
| 1998 | 17 | 0.026 | 0.021 | 0.009 | 0.0029 | 85 | 0.035 | 0.026 | 0.019 | 0.003 |
| 1999 | --- | --- | --- | --- | --- | 98 | 0.028 | 0.024 | 0.018 | 0.002 |
| 2000 | --- | --- | --- | --- | --- | 97 | --- | 0.022 | 0.009 | 0.002 |
| 2001 | --- | --- | --- | --- | --- | 94 | --- | --- | 0.002 | 0.001 |
| California Hourly Ambient Air Quality Standard: 0.250 ppm California 24-hr Ambient Air Quality Standard: 0.040 ppm National Annual Ambient Air Quality Standard: 0.030 ppm Source: CARB Air Quality Data CD, 2000 and CARB web site, http://www.arb.ca.gov/adam/ Accessed 2002/2003. | | | | | | | | | | |

The Calexico-East monitoring station, located 36 miles from the project site, is the closest monitoring station with representative SO₂ air quality data. This station, however, is influenced by commercial and industrial activities near Calexico, and therefore, the values presented are likely to be conservative estimates of the background levels near the proposed project site. No other ambient air quality monitoring stations in Imperial County record SO₂ concentrations.

Hydrogen Sulfide (H₂S)

The Niland - English Road air monitoring station was originally established to monitor the ambient levels of H₂S in the geothermal area of the Salton Sea. Because of extensive operating and quality control issues with the H₂S monitor, H₂S monitoring at this station was discontinued. Due to a lack of data to the contrary, the area is designated as an attainment / unclassified area. The Imperial County APCD recommended a background H₂S level of 24.6 µg/m³ (0.018 ppm) based on an average

level of the available data (1993, 1994) monitored before Units 1, 2, and 3, Vulcan, and Hoch were retrofitted with biofilter controls (ICAPCD, 2003a, page 10).

Summary

In summary, staff recommends using the background ambient air concentrations in **AIR QUALITY Table 9** for modeling and evaluating potential ambient air quality impacts from the proposed project.

AIR QUALITY Table 9
Staff Recommended Background Concentrations

| Pollutant | Averaging Time | Year | Location | Concentration ($\mu\text{g}/\text{m}^3$) | Concentration (ppm) |
|--------------------|------------------------|---------------|-----------------|--|--------------------------------|
| Ozone | 1 Hour | 2001 | Niland | 210 | 0.105 |
| Particulate Matter | Annual Geometric Mean | 2000 | Niland | 38.6 | --- |
| | Annual Arithmetic Mean | 2000 | Niland | 48.6 | --- |
| | 24 Hour | 2000 | Niland | 115 | --- |
| Carbon Monoxide | 8 Hour | 1998 | El Centro | 4,000 | 3.5 |
| | 1 Hour | 1998 | El Centro | 8,000 | 7.0 |
| Nitrogen Dioxide | Annual Average | 2002 | El Centro | 19 | 0.010 |
| | 1 Hour | 2002 | El Centro | 180 | 0.096 |
| Sulfur Dioxide | Annual Average | 1999 | Calexico | 5 | 0.002 |
| | 24 Hour | 1999 | Calexico | 47 | 0.018 |
| | 3 Hour | 1999 | Calexico | 63 | 0.024 |
| | 1 Hour | 1999 | Calexico | 73 | 0.028 |
| Hydrogen Sulfide | 1 Hour | 1993/ 1994 | Niland | 24.6 ¹ | 0.018 |

¹ – Data is from the ICAPCD's analysis of available monitoring data.

The maximum values from the closest representative monitoring station to the proposed project site, over the most recent three years of available data, where the year coverage (% data) is at least 75%, have been selected to represent the background ambient air quality for the proposed project site. In order to account for high wind related PM₁₀ events the 24-hour PM₁₀ background selected is the highest 4th high. This 24-hour PM₁₀ background concentration is considered to be more realistic normal worst-case background to which any and all modeling results can be added. If staff chose the background as the highest high that occurred during high wind events then only modeling results from the days with similar high winds could be added to the background. Additionally, the standard is focused on man-made pollution impacts, which are not represented during high wind dust storm events.

PROJECT DESCRIPTION AND EMISSIONS

This section describes the project construction and the operating design and criteria pollutant control devices as described in the Salton Sea Unit 6 Project Application for Certification (SSU6 2002a).

CONSTRUCTION

The proposed project construction schedule is expected to take 26 months. On-site building of the facility is expected to take 20 months (SSU6 2002a, DR #56).

Construction of the power plant facility will start in the sixth month. Construction and startup of the power plant from the start of mobilization to commercial operation is expected to take at least 19 months. Construction of the new electrical transmission lines is estimated to take approximately 12 months. During the construction period, air emissions will be generated from the exhaust of heavy equipment and well flow testing, and fugitive dust from activity such as grading, excavating, and well drilling. Fugitive dust emissions will occur due to the temporary disturbance of an estimated 479.5 acres (SSU6 2002a, Table 3.2-2, pg. 3-50), including the energy facility, construction staging and lay-down areas, production and injection wells, pipelines, interconnection poles, access roads, parking areas, and pull sites. **AIR QUALITY Tables 10 through 12** summarize the estimated levels of criteria pollutants generated from the construction activities at the Salton Sea Unit 6 Project site (SSU6 2002a).

Air Quality Table 10
SSU6 Project Estimated Maximum Hourly Construction Emissions
For the Power Plant, Pipelines, and Transmission Lines, lb/hr

| Source | NO _x | CO | VOC | SO _x | PM ₁₀ | NH ₃ | H ₂ S |
|-------------------------------------|-----------------|-------|-------------------|-----------------|------------------|-----------------|------------------|
| Construction Equipment ^a | 26.42 | 19.78 | 3.82 | 0.48 | 1.49 | --- | --- |
| Delivery Trucks ^a | 10.69 | 3.16 | 0.83 | 0.10 | 0.35 | --- | --- |
| Worker Travel ^a | 7.62 | 89.31 | 9.72 | 0.06 | 0.20 | --- | --- |
| Fugitive Dust ^b | --- | --- | --- | --- | 11.7 | --- | --- |
| Sub-Total ^c | 41.0 | 108.3 | 13.4 | 0.60 | 13.4 | --- | --- |
| Well Drilling | 25.97 | 3.17 | 0.36 | 0.73 | 1.07 | --- | --- |
| Well Flow Testing | --- | --- | 0.33 ^d | --- | 96.8 | 70.8 | 17.7 |
| Total | 67 | 111 | 13.8 | 1.3 | 98 | 70.8 | 17.7 |

Source: SSU6 2002a. Detailed calculations located in Appendix G, Tables G-1 through G-1.6 (fugitive dust), G-2 (well drilling), G-3 to G-3.11 (construction equipment, worker travel, and delivery trucks), and G-4 (well flow testing).

Note(s):

- a. Maximum emissions calculated assuming 8 hours/day and 20 days/month.
- b. Fugitive Dust emissions include: erosion, delivery trucks, worker travel, and construction equipment. Erosion emissions are assumed to occur 24 hours/day, 30 days/month. All others are assumed to occur 8 hours/day, 20 days/month.
- c. Maximum emissions do not occur in the same month. The sub-total presented is the highest hourly emissions occurring during any one month.
- d. VOC emissions based on benzene, toluene, and xylenes. Based on the applicant's revised VOC data these totals should be multiplied by 2.07 to include all VOCs.

Air Quality Table 11
SSU6 Project Estimated Maximum Daily Construction Emissions
For the Power Plant, Pipelines, and Transmission Lines, lb/day

| Source | NO _x | CO | VOC | SO _x | PM ₁₀ | NH ₃ | H ₂ S |
|-------------------------------------|-----------------|--------|-------------------|-----------------|------------------|-----------------|------------------|
| Construction Equipment ^a | 211.4 | 158 | 30.6 | 3.9 | 11.9 | --- | --- |
| Delivery Trucks ^a | 85.51 | 25.27 | 6.61 | 0.78 | 2.82 | --- | --- |
| Worker Travel ^a | 60.94 | 714.48 | 77.75 | 0.46 | 1.62 | --- | --- |
| Fugitive Dust ^b | --- | --- | --- | --- | 114.0 | --- | --- |
| Sub-Total ^c | 327.8 | 866.2 | 107.1 | 4.8 | 128.9 | --- | --- |
| Well Drilling | 623.3 | 76.08 | 8.64 | 17.52 | 25.68 | --- | --- |
| Well Flow Testing | --- | --- | 8.04 ^f | --- | 2323 | 1699 | 424.8 |
| Total ^c | 951 | 942 | 116 | 22 | 2478 | 1699 | 424.8 |

Source: SSU6 2002a. Detailed calculations located in Appendix G, Tables G-1 through G-1.6 (fugitive dust), G-2 (well drilling), G-3 to G-3.11 (construction equipment, worker travel, and delivery trucks), and G-4 (well flow testing).

Note(s):

- a. Maximum emissions calculated assuming 8 hours/day and 20 days/month.
- b. Fugitive Dust emissions include: erosion, delivery trucks, worker travel, and construction equipment. Erosion emissions are assumed to occur 24 hours/day, 30 days/month. All others are assumed to occur 8 hours/day, 20 days/month.
- c. Maximum emissions do not occur in the same month. The sub-total presented is the highest hourly and daily emissions occurring during any one month.
- d. Well Drilling maximum daily emissions are based on peak hourly emissions provided in Table G-2, assuming 24 hours.
- e. Well Flow Testing maximum daily emissions are based on hourly emissions provided in Table G-4, assuming 24 hours. Maximum hourly emissions are for a single production well.
- f. VOC emissions based on benzene, toluene, and xylenes. Based on the applicant's revised VOC data these totals should be multiplied by 2.07 to include all VOCs.

Air Quality Table 12
SSU6 Project Estimated Maximum Annual Construction Emissions
For the Power Plant, Pipelines, and Transmission Lines, tons/year

| Source | NO _x | CO | VOC | SO _x | PM ₁₀ | NH ₃ | H ₂ S |
|--------------------------------|-----------------|-------|-------------------|-----------------|------------------|-----------------|------------------|
| Construction Equipment | 20.0 | 15.5 | 2.9 | 0.4 | 1.1 | --- | --- |
| Delivery Trucks | 7.13 | 2.107 | 0.551 | 0.07 | 0.23 | --- | --- |
| Worker Travel | 6.29 | 73.72 | 8.02 | 0.05 | 0.17 | --- | --- |
| Fugitive Dust | --- | --- | --- | --- | 13.13 | --- | --- |
| Sub-Total | 33.42 | 91.33 | 11.47 | 0.52 | 14.63 | --- | --- |
| Well Drilling ^a | 124.25 | 15.18 | 1.71 | 3.49 | 5.12 | --- | --- |
| Well Flow Testing ^b | --- | --- | 0.16 ^c | --- | 44 | 34.3 | 8.56 |
| Total | 158 | 107 | 13.3 | 4.0 | 64 | 34.3 | 8.56 |

Source: SSU6 2002a, Table 5.1-21 (total). Detailed calculations located in Appendix G, Tables G-1 through G-1.6 (fugitive dust), G-2 (well drilling), G-3 to G-3.11 (construction equipment, worker travel, and delivery trucks), and G-4 (well flow testing).

Note(s):

- a. Well Drilling annual emissions are based upon 900 days of drilling and average fuel use (100% load equals 2284.8 gal/day – actual highest of three wells is 1012 gal/day or 44.3%).
- b. Well flow testing based on only one well being flow tested at a time. Annual emissions from production wells are based on 768 hours for 10 wells. Annual emissions from injection wells are based upon 240 hours for 5 wells. Production wells - 96 hours per well (one well on each of Pads OB1-OB4). Production wells - 72 hours per well (one well on each of Pads OB1-OB4). Production wells - 48 hours per well (both wells on Pad OB-5).
- c. VOC emissions based on benzene, toluene, and xylenes. Based on the applicant's revised VOC data these totals should be multiplied by 2.07 to include all VOCs.

The construction vehicle emissions provided above were based on South Coast Air Quality Management District (SCAQMD) CEQA Handbook emission factors and load factors, and the estimated number of operational hours for each piece of equipment throughout project

construction outlined in Appendices G-3 through G-3.5 of the AFC (SSU6 2002a). The emission estimates provided above do not include the potential emission reductions that may occur based on the application of tailpipe emission controls required in Condition of Certification **AQ-C3**, and use somewhat dated emission factors that may overestimate the potential equipment emissions. However, the emission estimates use an 8-hour per day, 20 day per month construction schedule that might underestimate maximum daily and annual emissions.

The construction emissions estimate for SSU6 is higher than the estimated construction emissions for most of the gas turbine power plant projects recently licensed or currently being evaluated by the CEC. This is mainly due to geothermal unique emissions sources, well flow testing, and the construction/drilling of the wells and well pads. In general, the onsite construction emission estimate is similar to those seen for medium to large gas turbine projects.

OPERATIONAL PHASE

Equipment Description

The major equipment proposed in the application includes the following:

- Geothermal Resource Production Facility (RPF) including ten geothermal fluid extraction (production) wells located on five well pads; brine and steam handling facilities from the production wellheads, through the crystallizer/ clarifier system, to the injection wellheads; solids handling system; two brine ponds; seven brine injection wells on three well pads; two new injection wells on two existing pads, one dedicated to injection of cooling tower blowdown, and the other to injection of aerated brine when accumulated in the brine pond; and steam polishing equipment designed to provide turbine-quality steam to the Power Generation Facility.
- Merchant class geothermal-powered Power Generation Facility (PGF) consisting of one geothermal power block. The PGF includes a condensing turbine/generator set, gas removal and pollutant abatement systems, and the heat rejection system.
- A 161 kV switchyard and several power distribution centers. Electricity generated by the SSU6 Project will be delivered to an existing Imperial Irrigation District (IID) electrical transmission line (L-Line), via the proposed 161 kV L-Line Interconnection, and ultimately connect to the existing El Centro and Avenue 58 substations located west of the project site.
- The PGF includes a 3,600-revolutions-per-minute (RPM) multi-casing, triple-pressure [High-Pressure (HP), Standard-Pressure (SP), and Low-Pressure (LP)], exhaust flow condensing turbine generator nominally rated at 200 megawatts (MW). The turbine is directly coupled to a totally enclosed water and air-cooled (TEWAC) synchronous type generator. The generator is expected to have a design rating of 235 megavolt amperes (MVA) at a power factor of 0.85 lagging. The turbine-generator unit will be fully equipped with all the necessary auxiliary systems for turbine control and speed protections, lubricating oil, gland sealing, generator excitation, and cooling.
- Cooling system consisting of two 10-cell counterflow cooling towers, equipped with 480-Volt fans. Each of the two cooling towers will be equipped with three 50 percent

capacity, vertical, wet-pit circulating water pumps, and one 100 percent capacity, vertical, wet-pit auxiliary water pump.

- Common facilities include a control building, a service water pond, and other ancillary facilities.
- Standby diesel emergency generators including a 2 MW, 4,160-volt generator and a 300 kW, 480-volt generator. (2300 kW total)
- Fire protection system with three pumps: a 2,500-gpm motor driven fire pump; 2,500-gpm (290-Hp) diesel engine driven fire pump; and a 25-gpm jockey pump.

Equipment Operation

The power plant will be located on approximately 80 acres (Plant Site) of a 160-acre parcel within the unincorporated area of Imperial County, California. Two injection wells and two production wells will be located on the plant site, and the remaining eight production wells (four well pads) and seven injection wells (three well pads) will be located offsite. Nine geothermal power plants are within a 2-mile radius of the proposed plant site. Units 1, 2, 3, 4, and 5 Geothermal Power Plants lie to the southwest, while the Vulcan and Hoch Geothermal Power Plants lie to the southeast. The J.J. Elmore and Leathers geothermal power plants are to the northeast.

The project will be nominally rated at 200 MW (gross) and will produce 185 MW of on line power.

Emission Controls

The proposed geothermal facility does not use combustion to generate electricity. Therefore, only minimal emissions of criteria pollutants, such as NO_x, CO, SO₂, and VOCs are expected from power production equipment. The applicant proposes to use best available control technology, management practices, and process monitoring equipment to minimize the air emissions from the proposed plant. The two criteria pollutants that would the potential to cause significant impacts to air quality from normal plant operations if uncontrolled are PM₁₀ and H₂S.

The cooling towers are the primary source of air emissions at the power plant during normal operations. These emissions include the introduced non-condensable gases, offgassing from the condensate, and from liquid drift. Non-condensable gases, which flow from the flashing steam of the brine, collect in the condenser of the turbine generator, along with the condensate, where the non-condensable gases are separated. The applicant has estimated that approximately 80% of the H₂S will be vented with the non-condensable gases and approximately 20% will remain entrained in the condensate (ICAPCD 2003a, page 14). Practically all of the benzene in the brine will be vented with the non-condensable gases and no measurable benzene emissions will be entrained in the condensate (ICAPCD 2003a, page 25).

The non-condensable gases will be vented to a LO-CAT System. The LO-CAT System is a liquid reduction-oxidation process that uses a non-toxic iron catalyst to convert H₂S to elemental sulfur. The applicant is proposing a permitting control level for H₂S of 99.5 percent of the non-condensable gas emissions. The LO-CAT System will also reduce mercury emissions.

After the H₂S emissions are reduced by the LO-CAT System, the non-condensable gas (NCG) stream will be vented through a carbon absorption unit to control brine benzene. This is the first time that carbon absorbers have been proposed for the control of benzene in a geothermal facility. Pilot testing conducted by CalEnergy at a Salton Sea power plant has shown that activated carbon will absorb 95 percent of the benzene in a NCG stream containing 40 to 70 parts per million (ppm) of benzene. The applicant is proposing a control level for benzene of 95 percent. Additionally, arsenic and other gaseous metal halides in the non-condensable gas stream are anticipated to be reduced by 90 percent collectively by the two systems (LO-CAT and benzene abatement systems). After the carbon absorbers, the non-condensable gases are conveyed to each of the cooling towers cells (20 total) and released equally to each cell.

Some of the pollutants/impurities that collect in the condenser of the steam turbine generator separate into the water condensate stream, rather than separating into the non-condensable gas stream. These pollutants include H₂S and ammonia. As previously mentioned, the applicant estimated that approximately 20% of the H₂S would remain entrained in the condensate (ICAPCD, 2003a, page 14). When these condensates are collected they will be conveyed to a biofilter oxidizer cell to be installed at the condenser inlet end of each of the cooling towers. The oxidizers operate as a liquid bioreactor and convert the H₂S in solution to sulfate (SO₄) in the condensate. In practice, these oxidizers have reduced H₂S concentration levels down to nondetectable levels in the cooling tower exhaust. The applicant is proposing a H₂S control level of 95 percent for the project's biofilter oxidizer. After the oxidizer, the condensate is routed through the cooling towers where the remaining gaseous phase pollutants/impurities are stripped/offgassed. The applicant was supposed to have submitted source test results to the District providing data on biofilter oxidizer H₂S control efficiency on February 28, 2003. The tests were conducted; however, there was a problem with the test procedures and the test results were not provided to the District by the deadline date. The applicant is currently in violation and will be seeking a variance to allow additional time to complete these tests. The applicant's assumed H₂S control efficiency for the biofilter oxidizer cannot be substantiated at this time.

Ammonia, an impurity in the brine, flashes with the high, standard, and low pressure steam and is then re-condensed into the condensate stream. Ammonia's high affinity with water keeps almost all of the ammonia in the condensate stream, with only a very small fraction ending up in the non-condensable gas stream. The condensate stream eventually ends up in the cooling tower where the majority of the ammonia emissions are stripped/offgassed into the cooling tower exhaust. Additionally, some of the flashed ammonia remains in the steam that is used in and then exhausted from the dilution water heaters.

The cooling towers use the condensate for cooling tower makeup. Substances present in the condensate can be contained in the drift of the cooling tower. The cooling tower emissions will be controlled by maintaining the TDS concentration in the circulating water and by using drift eliminators with an efficiency of 0.0005 percent (SSU6 2002b, Data Request Response #5).

Particulate emissions from the filter cake handling equipment will be controlled by minimizing handling and keeping the filter cakes covered.

The turbine bypass provides the ability to divert high-pressure steam, which contains almost all of the H₂S produced by the geothermal resource (greater than 90 percent), from the turbine inlet directly into the condenser to reduce H₂S emissions below an acceptable level in the event of a plant trip during operations. SP and LP steam will be diverted to two steam vent tanks and released to the atmosphere. The proposed bypass will be equipped with a motor-actuated isolation valve that is closed during normal operation. Condensed steam from the turbine condenser will be routed through the hotwell pumps to the plant condensate distribution system. As steam condenses, non-condensable gases will continue to be routed to the LO-CAT and benzene systems for H₂S and benzene abatement.

Since maintaining vacuum conditions is preferred in the main condenser during turbine bypass operation to limit stress on the plant systems, non-condensable gases are routed to the LO-CAT system through the vacuum pumps, air ejectors and intercondensers. In the event that standby electrical power is limited, a bypass around the vacuum pump will be installed. In this mode of operation, condenser pressure will increase to 2 pounds-per-square-inch (psig), providing sufficient pressure to move the non-condensable gas through the air ejectors, intercondensers and to the abatement plant. Motive steam to the air ejectors will be secured in this configuration. Auxiliary cooling pumps, intercondensers, a condensate pump, two circulating water pumps and cooling tower fans will remain in service to condense the steam and cool the non-condensable gases below 130°F, suitable for processing in the LO-CAT and benzene abatement systems.

The operation of the turbine bypass system is dependent on the availability of electrical power and the operation of certain plant equipment. Depending on the particular circumstances triggering an upset condition, a total loss of power or equipment failure may prevent operation of the turbine bypass. To provide a safe method of relieving the high-pressure steam during upset conditions, the plant will be equipped with two high-pressure atmospheric flash tanks. Temporary emissions may occur for a short period of time at the high-pressure steam vents until the turbine bypass system can be placed in service or until steam generation could be secured (SSU6 2002a, page 3-22).

Project Normal Operating Emissions

Air emissions will be generated from operating the major project components. **AIR QUALITY Tables 13 through 15** summarize the maximum (worst-case) estimated levels of the different criteria pollutants associated with project operation. The assumptions used in calculating the emissions in these tables include:

- usage factors based on operating experience
- emission factors guaranteed by the manufacturer,
- emission from engines based on 100 hours of operation per year, and the engines will not be tested at the same time, or on the same day,
- facility base-loaded operation of 24 hours per day, 365 days per year, for a total of 8,760 hours per year, and
- emissions based on the maximum design flow rate of geothermal brine during summer time conditions to generate 175 MW. In the wintertime, the megawatts that

can be generated at this design flow rate are approximately 185 MW. Base-load operations are not expected to be below 175 MW.

- The cooling tower and dilution water heater emissions are based on mass balance calculations using estimated stream flow rates and expected pollutant concentrations.

The proposed project's hourly emissions of criteria air pollutants are shown in **AIR QUALITY Table 13**.

AIR QUALITY Table 13
SSU6 Project Maximum Hourly Emissions, lb/hr

| Operational Source | NO _x | CO | VOC | SO _x | PM ₁₀ | NH ₃ | H ₂ S |
|---|-----------------|--------------|-------------|-----------------|------------------|-----------------|------------------|
| Cooling Tower – NCG ^a | --- | --- | 0.375 | --- | --- | 0.12 | 0.766 |
| Cooling Tower – Offgassing | --- | --- | --- | --- | --- | 712 | 1.687 |
| Cooling Tower – Drift | --- | --- | --- | --- | 2.91 | 0.0008 | --- |
| Dilution Water Heater | --- | --- | --- | --- | 0.14 | 16.54 | 0.678 |
| Filter Cake Silica | --- | --- | --- | --- | 0.0064 | --- | --- |
| Filter Cake Sulfur | --- | --- | --- | --- | 4.4E-5 | --- | --- |
| EG-480 Engine ^b | --- | --- | --- | --- | --- | --- | --- |
| EG-4160 Engine ^b | 34.24 | 2.19 | 0.82 | 1.15 | 0.65 | --- | --- |
| Fire Pump Engine ^b | --- | --- | --- | --- | --- | --- | --- |
| Operation & Maintenance (O&M) Equipment | 5.49 | 29.55 | 1.70 | 0.27 | 0.06 | --- | --- |
| O&M Fugitive Dust | --- | --- | --- | --- | 0.074 | --- | --- |
| Total Maximum Hourly Emissions (lb/hr) | 39.73 | 31.74 | 2.52 | 1.42 | 3.84 | 728.7 | 3.13 |

Sources: SSU6 2002a, Tables 5.1-23 through 5.1-31. Detailed calculations located in Appendix G, Tables G-6 through G-13. SSU6 2002b, Data Request Response #5 and Attachment AQ-5 (Revised Tables 5.1-25, 5.1-26, 5.1-32, G-7, G-8, and G-13). SSU6 2003a, Data Request Response #113.

Note(s):

a. Non-condensable gases

b. The engines will not be tested at the same time, or on the same day.

AIR QUALITY Tables 14 and 15 summarizes the maximum (worst case) daily and annual average estimated criteria pollutants emissions from the project, using the operating emissions assumptions provided above.

AIR QUALITY Table 14
SSU6 Project Estimated Maximum Daily Emissions, lb/day

| Operational Source | NO _x | CO | VOC | SO ₂ | PM ₁₀ | NH ₃ | H ₂ S |
|---|-----------------|---------------|--------------|-----------------|------------------|-----------------|------------------|
| Cooling Tower – NCG | --- | --- | 9.01 | --- | --- | 2.88 | 18.38 |
| Cooling Tower – Offgassing | --- | --- | --- | --- | --- | 17,088 | 40.49 |
| Cooling Tower – Drift | --- | --- | --- | --- | 69.8 | --- | --- |
| Dilution Water Heater | --- | --- | --- | --- | 3.26 | 396.96 | 16.27 |
| Filter Cake Silica | --- | --- | --- | --- | 0.0512 | --- | --- |
| Filter Cake Sulfur | --- | --- | --- | --- | 0.00107 | --- | --- |
| EG-480 Engine | --- | --- | --- | --- | --- | --- | --- |
| EG-4160 Engine ^a | 34.24 | 2.19 | 0.82 | 1.15 | 0.65 | --- | --- |
| Fire Pump Engine | --- | --- | --- | --- | --- | --- | --- |
| Operation & Maintenance (O&M) Equipment | 43.90 | 236.41 | 13.58 | 2.18 | 0.5024 | --- | --- |
| O&M Fugitive Dust | --- | --- | --- | --- | 1.78 | --- | --- |
| Total Maximum Daily Emissions | 79.14 | 238.60 | 23.41 | 3.33 | 76.04 | 17,488 | 75.14 |

Sources: SSU6 2002a, Tables 5.1-23 through 5.1-31. Detailed calculations located in Appendix G, Tables G-6 through G-13. SSU6 2002b, Data Request Response #5 and Attachment AQ-5 (Revised Tables 5.1-25, 5.1-26, 5.1-32, G-7, G-8, and G-13). SSU6 2003a, Data Request Response #113 (VOCs).

Note(s):

a. Only one engine is tested for a maximum of 1 hour per day.

AIR QUALITY Table 15
SSU6 Project Estimated Maximum Annual Average Emissions, tons/year

| Operational Source | NO _x | CO | VOC | SO ₂ | PM ₁₀ | NH ₃ | H ₂ S |
|---|-----------------|--------------|-------------|-----------------|------------------|-----------------|------------------|
| Cooling Tower – NCG | --- | --- | 1.64 | --- | --- | 0.526 | 3.36 |
| Cooling Tower – Offgassing ^a | --- | --- | --- | --- | --- | 2,681 | 7.39 |
| Cooling Tower – Drift | --- | --- | --- | --- | 12.74 | 0.0035 | --- |
| Dilution Water Heater | --- | --- | --- | --- | 0.59 | 72.45 | 2.97 |
| Filter Cake Silica ^b | --- | --- | --- | --- | 0.0014 | --- | --- |
| Filter Cake Sulfur ^b | --- | --- | --- | --- | 2.92E-05 | --- | --- |
| EG-480 Engine ^c | 0.2 | 0.01 | 0.002 | 0.01 | 0.001 | --- | --- |
| EG-4160 Engine ^c | 1.7 | 0.11 | 0.04 | 0.06 | 0.03 | --- | --- |
| Fire Pump Engine ^c | 0.2 | 0.01 | 0.003 | 0.01 | 0.002 | --- | --- |
| Operation & Maintenance (O&M) Equipment | 1.6 | 10.13 | 0.55 | 0.35 | 0.0232 | --- | --- |
| O&M Fugitive Dust | --- | --- | --- | --- | 0.321 | --- | --- |
| Total Average Annual Emissions (tpy) | 3.7 | 10.24 | 2.24 | 0.43 | 13.71 | 2,754 | 13.72 |

Sources: SSU6 2002a, Tables 5.1-23 through 5.1-31. Detailed calculations located in Appendix G, Tables G-6 through G-13. SSU6 2002b, Data Request Response #5 and Attachment AQ-5 (Revised Tables 5.1-25, 5.1-26, 5.1-32, G-7, G-8, and G-13). SSU6 2003a, Data Request Response #113 (VOCs).

Note(s):

a. Cooling tower offgassing gas annual ammonia emissions are based upon an annual average of 612 lbs/hr at 183 MW (SSU6 2002b, DR#1).

b. Annual average emissions for filter cake silica and sulfur are based on 0.00768 lbs/day and 0.00016 lbs/day, respectively.

c. Engine annual emissions based on 100 hours of operation.

Project Potential Temporary Operating Emissions

Well rework/new well drilling, well flow activities, steam vent tanks, and plant startup emission sources are not routine, but are expected to occur from time to time. Based on past experience at the existing Salton Sea Units, the applicant has estimated the duration, frequency, and emissions for these sources.

Over time, the existing wells may experience issues with capacity and pressure drop. Normally these are not issues associated with the geothermal reservoir, but with the specific conditions around a well. The applicant anticipates the following rework schedule:

- Production Wells. A coil tubing clean-out of each production well (10 total) is scheduled every 2 to 6 years, with an average of 4 years. This involves two 2-ton trucks (one water truck, one nitrogen truck). Duration of work is 3 days.
- Production Wells. Re-drill of a production well (10 total) is typically scheduled every 7 to 17 years, with an average of 12 years. Re-drilling one well per year is anticipated. Duration of work is 21 days.
- Injection Wells. Re-drill of an injection well (7 total) is planned every 2 to 4 years. Re-drilling one to two wells per year is anticipated. Duration of work is 10 days. New pipe is installed in the well.
- Plant Well. A re-drill is scheduled every 4 years (1 well). Duration of work is 8 days.
- Condensate Well. A re-drill is scheduled every 4 years (1 well). Duration of work is 10 days.
- The emission estimates for well rework drilling are based on typical drill rig horsepower, drilling schedule and Caterpillar engine emission factors. The well flow and steam vent tank emissions are based on mass balance calculations using estimated stream flow rates and estimated stream pollutant concentrations.

AIR QUALITY Table 16 shows the emissions estimated for temporary well rework/new well drilling emissions.

Air Quality Table 16
SSU6 Project Estimated Well Rework/New Well Drilling Emissions

| | NO _x | CO | VOC | SO _x | PM ₁₀ |
|--------------------------|-----------------|------|------|-----------------|------------------|
| Pounds Per Hour Per Well | 25.97 | 3.17 | 0.36 | 0.73 | 1.07 |
| Annual Emissions (tpy) | 6.90 | 0.84 | 0.09 | 0.19 | 0.285 |

Source: SSU6 2002a, Table 5.1-33. Detailed calculations located in Appendix G, Table G-2.

Note(s):

- a. NO₂, CO, VOC and PM₁₀ emission factors based on Caterpillar documented emission data for 3412DITTA Engines, SO₂ based on 0.05% Sulfur fuel. Engine Hp based upon typical drill rig used in the Salton Sea area.
- b. Long term emissions are based upon 50 days per year of drilling (vs. 900 days for construction) and average fuel use.

Well flow activities include warming up a production well, which are warmed up following clean-out or re-drill activities or before a plant startup. The applicant anticipates that each of the 10 production wells will be shut down for operational reasons twice per year. A warm up is required for each shutdown. In a year with no coil tubing clean-outs or re-drills, the flow activities are estimated to be approximately 40 hours per year. Coil

tubing clean-outs require an additional 48 hours per well. Three coil clean-outs are anticipated per year. The re-drilling of a production well will also require a flow run of about 48 hours. Only one re-drilling of a production well is anticipated per year. The re-drilling of an injection well requires a flow run of approximately 18 hours. Re-drilling of three injection wells is anticipated each year. **AIR QUALITY Table 17** provides the potential emissions for well flow activities.

Air Quality Table 17
SSU6 Project Estimated Well Flow Run Emissions ^a

| | VOC ^d | PM ₁₀ | NH ₃ | H ₂ S |
|---------------------------------------|------------------|------------------|-----------------|------------------|
| Production Well (lb/hr) | 0.34 | 96.8 | 70.8 | 17.7 |
| Injection Well (lb/hr) | 0.28 | 56.0 | 59.0 | 14.7 |
| Annual Emissions (tpy) ^{b,c} | 0.046 | 12.7 | 9.8 | 2.4 |

Source: SSU6 2002a, Table 5.1-34. Detailed calculations located in Appendix G, Table G-14. SSU6 2002c, Data Response #100 and Revised Table G-14.

Note(s):

- a. A well could be venting for a total of 48 hours. Only one well will be flow tested at a time.
- b. Annual emissions from production wells are based on 232 hours [40 hours for warm ups, 144 hours for three coil tubing clean-outs (48 hr/each), and 48 hours for re-drilling one production well].
- c. Annual emissions from injection wells are based on 54 hours for re-drilling three injection wells (18 hr/each).
- d. VOC emissions based on benzene, toluene, and xylenes. Based on the applicant's revised VOC data these totals should be multiplied by 2.07 to include all VOCs.

In situations where there is a turbine trip and the turbine cannot receive the steam generated, the excess steam is routed to a turbine bypass and to the steam vent tanks. This system is also used for cold and warm plant startups and shutdowns. The applicant expects a trip to occur six times a year and last for less than two hours. **AIR QUALITY Table 18** provides the potential emissions for steam vent tanks during turbine bypass.

Air Quality Table 18
SSU6 Project Estimated Steam Vent Tank Emissions

| | VOC ^b | PM ₁₀ | NH ₃ | H ₂ S |
|--------------------------------------|------------------|------------------|-----------------|------------------|
| Low Pressure Vent Tank (lbs/hr) | 0 | 1.59 | 17.2 | 4.21 |
| Standard Pressure Vent Tank (lbs/hr) | 0.36 | 1.28 | 68.8 | 13.5 |
| Cooling Tower (lbs/hr) | 0.18 | 34.6 | 546 | 2.06 |
| Dilution Water Heater (lbs/hr) | 0 | 0.134 | 16.5 | 0.678 |
| Annual Emissions (tpy) | 0.013 | 0.94 | 16.2 | 0.511 |

Source: SSU6 2002a, Table 5.1-35. Detailed calculations located in Appendix G, Table G-15.

Note(s):

- a. Annual emissions assume 50 hours at 100 percent load.
- b. VOC emissions based on benzene, toluene, and xylenes. Based on the applicant's revised VOC data these totals should be multiplied by 2.07 to include all VOCs.

The applicant anticipates one cold plant startup per year. **AIR QUALITY Table 19** provides the estimated emissions for plant startup.

Air Quality Table 19
SSU6 Project Estimated Startup Emissions

| | VOC ^e | PM ₁₀ | NH ₃ | H ₂ S |
|---|------------------|------------------|-----------------|------------------|
| Production Test Unit (lbs/hr) ^a | 0.34 | 96.8 | 70.8 | 17.68 |
| 100% LP Vent Tank (lbs/hr) ^b | 0 | 1.59 | 17.2 | 4.21 |
| 100% SP Vent Tank (lbs/hr) ^b | 0.36 | 1.28 | 68.8 | 13.5 |
| 100% Cooling Tower (lbs/hr) ^c | 0.18 | 3.46 | 546 | 2.06 |
| 100% Dilution Water Heaters (lbs/hr) ^c | 0 | 0.134 | 16.54 | 0.678 |
| Annual Emissions (tpy) ^d | 0.0087 | 2.20 | 5.15 | 0.418 |

Source: SSU6 2002a, Table 5.1-36. Detailed calculations located in Appendix G, Table G-16. SSU6 2002c, Data Request Response #101.

Note(s):

- a. A total of 45 hours will be venting at Production Test Unit emissions rates (1.2 million lbs/hr steam)
- b. A total of 5 hours at 7% of full flow will be venting at LP and SP Vent Tanks
- c. A total of 5 hours at 2.52 times full flow (per the facility startup schedule presented in Table G-5.1) will be venting at Cooling Towers and Dilution Water Heaters.
- d. A period is one startup per year.
- e. VOC emissions based on benzene, toluene, and xylenes. Based on the applicant's revised VOC data these totals should be multiplied by 2.07 to include all VOCs.

INITIAL COMMISSIONING

The initial commissioning of a power plant refers to the time frame between the completion of the construction and the consistent production of electricity for sale on the market. For most power plants, operating emission limits usually do not apply during the initial commissioning procedures.

The range of commissioning activities for the SSU6 geothermal power plant include the following: 1) well warm-up; 2) production line warm-up; 3) preheat RPF vessels; 4) steam blow; 5) turbine preheat; 6) various load tests; and 7) turbine performance test. An estimate of the hours required for each of these activities has been assessed.

During commissioning, the brine flow from a production well would be routed to the production test unit (PTU) for well warm-up (approx. 18 hours). Afterwards, the brine flow would be routed to the main production line allowing it to flow through the plant. Generated steam would vent at the steam vent tanks. In addition to warming up the production line, the brine and steam would preheat the RPF vessels. These activities would occur for approximately 6 hours. The steam vent tanks, however, would continue to vent steam throughout the remainder of the commissioning period. The remaining production wells (eight) would then be routed to the PTU (18 hours each) for well warm-up. Again, the brine flow would be routed to the main production line, where the brine flows through the plant and the steam vents to the steam vent tanks. Once all nine wells are flowing, steam would be routed through selected steam pipelines up to the turbine and vented through temporary openings (i.e. steam blows). After a run of approximately 12 hours at each of the six steam lines, the turbine preheat and other various tests would occur. Once the testing is completed, a performance test would be conducted for the turbine under various loads. To bring the power plant online, a total of 14 to 15 days or 354 hours of commissioning activities are anticipated. Plant commissioning activities and air pollutant emissions expected from plant commissioning are summarized in **AIR QUALITY Tables 20 and 21**, respectively.

AIR QUALITY TABLE 20
Estimated Power Plant Commissioning Schedule^a

| Commissioning Activities | Event Duration | Emission Location | Emission Rate |
|---|-----------------------|--|---|
| Task | | | |
| No. 1 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 1 Production Line Warm-up | 6 hours | Vent Tanks (HP,SP,LP) | 7.0% of Vent Tanks (HP,SP,LP) |
| Preheat RPF Vessels | 12 hours | Vent Tanks (HP,SP,LP) | 7.0% of Vent Tanks (HP,SP,LP) |
| No. 2 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 2 Production Line Warm-up | 18 hours | Vent Tanks (HP,SP,LP) | 14% of Vent Tanks (HP,SP,LP) |
| No. 3 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 3 Production Line Warm-up | 18 hours | Vent Tanks (HP,SP,LP) | 21% of Vent Tanks (HP,SP,LP) |
| No. 4 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 4 Production Line Warm-up | 18 hours | Vent Tanks (HP,SP,LP) | 28% of Vent Tanks (HP,SP,LP) |
| No. 5 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 5 Production Line Warm-up | 18 hours | Vent Tanks (HP,SP,LP) | 35% of Vent Tanks (HP,SP,LP) |
| No. 6 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 6 Production Line Warm-up | 18 hours | Vent Tanks (HP,SP,LP) | 42% of Vent Tanks (HP,SP,LP) |
| No. 7 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 7 Production Line Warm-up | 18 hours | Vent Tanks (HP,SP,LP) | 49% of Vent Tanks (HP,SP,LP) |
| No. 8 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 8 Production Line Warm-up | 18 hours | Vent Tanks (HP,SP,LP) | 56% of Vent Tanks (HP,SP,LP) |
| No. 9 Well Warm-up | 18 hours | Production Test Unit | PTU (Well Startup) |
| No. 9 Production Line Warm-up | 6 hours | Vent Tanks (HP,SP,LP) | 63% of Vent Tanks (HP,SP,LP) |
| HP Steam Blow (First Line) | 12 hours | Steam Blow Stack, Vent Tanks (LP,SP, East HP) | Steam Blow Stack (HP), 63% Vent Tank (LP,SP), 31.5% Vent Tank (West HP) |
| HP Steam Blow (Second Line) | 12 hours | Steam Blow Stack, Vent Tanks (LP,SP, West HP) | Steam Blow Stack (SP), 63% Vent Tank (LP, West HP, East HP), 31.5% Vent Tank (SP) |
| SP Steam Blow (First then Second Line) | 24 hours | Steam Blow Stack, Vent Tanks (LP,SP, West HP, East HP) | Steam Blow Stack (LP), 63% Vent Tank (SP, West HP, East HP), 31.5% Vent Tank (LP) |
| LP Steam Blow (First then Second Line) | 24 hours | Steam Blow Stack, Vent Tanks (LP,SP, West HP, East HP) | Steam Blow Stack (LP), 63% Vent Tank (SP, West HP, East HP), 31.5% Vent Tank (LP) |
| Turbine Preheat, Vacuum Test, and Other Tests | 96 hours | Cooling Towers | 63% of Vent Tanks (HP,SP,LP) |
| Turbine Load Test, Etc. | 18 hours | Cooling Towers | 63% of Vent Tanks (HP,SP,LP) |
| Turbine Performance Test | 48 hours | Normal Operating Condition Emissions | |

Source: SSU6 2002a, Table G-5.1.

Note(s):

a. Times are approximate and subject to change when a more definitive startup program is developed. Some activities are scheduled to occur simultaneously.

AIR QUALITY TABLE 21
Estimated Power Plant Commissioning Emissions

| Source | Emissions Rate | Hours per Period | VOC ^a (lb/hr) | PM ₁₀ (lb/hr) | H ₂ S (lb/hr) | NH ₃ (lb/hr) |
|------------------------|-------------------------|------------------|--------------------------|--------------------------|--------------------------|-------------------------|
| PTU | 100% | 162 | 0.335 | 96.8 | 17.7 | 70.8 |
| LP Vent Tank | 100% | 159 | 0 | 1.59 | 4.21 | 17.2 |
| SP Vent Tank | 100% | 159 | 0.357 | 1.28 | 13.5 | 68.8 |
| HP Vent Tank | 100% | 159 | 3.22 | 3.96 | 173 | 700 |
| Dilution Water Heaters | 100% | 167 | 0 | 0.136 | 0.68 | 16.5 |
| Cooling Tower | 100% | 114 | 0.185 | 3.50 | 2 | 712 |
| Steamblow ^b | 31.5% of full Vent Tank | 72 | 0.375 | 0.717 | 19.99 | 82.53 |
| Total (tons/period) | --- | --- | 0.335 | 8.62 | 17.5 | 113.2 |

Sources: SSU6 2002a, Tables G-5 through G-5.6. SSU6 2002c, DR #99 and Revised Table G-5.

Note(s):

a. VOC emissions based on benzene, toluene, and xylenes. Based on the applicant's revised VOC data these totals should be multiplied by 2.07 to include all VOCs.

b. Steamblow emissions (lb/hr) are estimated based on the lbs/period divided 72 hours.

The emissions shown in Table 21, were determined through mass balance, using expected flow rates and expected pollutant concentrations. The emissions estimated here are subject to change based on the actual brine constituent concentrations.

PROJECT IMPACTS

MODELING APPROACH

The applicant's approach to the SSU6 Project consists of three major components affecting air quality, including: (1) Well field (well pads, production wells, injection wells, associated pipelines), (2) power plant, and (3) transmission line. Additionally, well field and power plant emissions have been divided into three areas including: (1) construction, (2) operations, and (3) temporary emissions. The construction emissions are from those activities associated with building the entire facility, including the commissioning period. The operations emissions are based on peak emissions associated with maximum design flow rates of brine through the facility. The temporary emissions are those associated with anticipated intermittent emissions from devices or processes that may occur, such as reworking wells and steam being sent to the steam vent tanks during an upset condition, following the commencement of power plant operations.

The applicant performed an air dispersion modeling analysis to evaluate the project's potential impacts on the existing ambient air pollutant levels, during construction, operation, and potential temporary activities. Air dispersion modeling provides estimates of the ground level concentrations of the pollutants emitted by the proposed project. Staff reviewed the applicant's modeling analysis and determined that the modeling performed was generally adequate, but in some cases the modeling assumptions and methodologies employed were too conservative. In other cases the applicant's modeling results show high impacts without any description of potential mitigation techniques. Therefore, staff has performed its own construction and operations modeling analyses, where appropriate, and is presenting the applicant's modeling analyses and staff's revised modeling analyses.

The applicant used the EPA-approved ISCST3 model to estimate the worst-case impacts of the project's estimated NO_x, PM₁₀, CO, SO_x, and H₂S emissions resulting from project construction, operation, and potential temporary activities. The ISC model is a steady-state Gaussian plume model, appropriate for regulatory use that can be used to assess pollution concentrations from a wide variety of emission sources. Modeled impacts were added to the available ambient background concentrations. A summary of the monitoring data is provided in the **Setting** section.

Staff compared the results of the modeling analysis with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or significantly contribute to an existing violation.

Inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the Imperial County Airport Station for the years 1995 to 1999. Upper air data for the same time period were taken from Tucson, Arizona. Staff found a few problems with how the meteorological data was processed. Missing wind speed data was routinely processed as calm, which is not the best method for filling missing wind speed data and could impact the modeling results. Also, processed data does not match the raw data and appears to have been offset by an hour or two. This problem seems to be occurring as a result of the use of the EPA recommended meteorological processing program PCRAMMET. Staff has seen this problem occur previously in another siting case when a similar raw meteorological data set was processed using PCRAMMET, and we are contacting EPA to determine if there is any way to avoid this consequence of using PCRAMMET.

CONSTRUCTION IMPACTS

The applicant modeled the emissions from construction activities including: (1) fugitive dust emissions, (2) well drilling combustion emissions, (3) construction equipment exhaust emissions, (4) well flow testing, and (5) plant commissioning. This analysis was completed using the ISCST3 model (Version 00101). The following modeling scenarios and assumptions were assumed to assess the impacts to ambient air quality standards (SSU6 2002a, p. 5.1-24 to 26):

- The first four activities were assumed to occur during the same time period.
- Combined worst-case construction pollutant emissions by construction month, based on the assumed construction schedule, type of construction activity and equipment use, for PM₁₀ occurs in month 18, for both NO₂ and SO₂ occurs in month 15, and for CO occurs in month 16.
- Fugitive dust (PM₁₀) was modeled as two area sources (wind erosion and equipment generated) covering the project site (Release Height=2.0 meters).
- Well drilling (PM₁₀, NO₂, SO₂, CO) was modeled as equivalent point sources with three rigs operating at the same time for the 24-hour averaging period. The three rig locations causing the highest collective concentrations were used in the evaluation.

For the annual period a total of 15 wells were assumed with the same stack parameters (H=14 feet, T=855°F, D=1.33 feet, V=112 feet/second, where H=height, T=temperature, D=diameter, V=velocity).

- Construction equipment exhaust (PM₁₀, NO₂, SO₂, CO) was modeled as four equivalent point sources uniformly emitting the equipment exhaust emissions (H=12 feet, T=850°F, D=0.49 feet, V=298 fps).
- Well flow testing (PM₁₀ and H₂S) was modeled as six point sources (Production Flow Run: One source with H=50 feet, T=226.7°F, D=9 feet, V=40 fps. Injection Flow Run: Five sources with H=37.92 feet, T=226.7°F, D=6 feet, V=48.7 fps).

AIR QUALITY Table 22 provides the results of the applicant modeling analyses for onsite facilities construction, well drilling, and well flow construction impacts.

AIR QUALITY Table 22
Applicant Construction Modeling Results

| Pollutant | Averaging Period | Project Impact (µg/m ³) | Background Concentration (µg/m ³) ^a | Total Impact (µg/m ³) | Limiting Standard (µg/m ³) | Type of Standard | Percent of Standard (%) |
|------------------------------|------------------|-------------------------------------|--|-----------------------------------|--|------------------|-------------------------|
| NO ₂ ^b | 1-Hour | 268 | 180 | 448 | 470 | CAAQS | 95 |
| | Annual | 5.2 | 19 | 24.2 | 100 | NAAQS | 24 |
| PM ₁₀ | 24-Hour | 72 | 115 | 187 | 50 | CAAQS | 374 |
| | Annual Geo. Mean | 15 | 38.6 | 53.6 | 30 | CAAQS | 179 |
| CO | 1-Hour | 193 | 8,000 | 8,193 | 23,000 | CAAQS | 36 |
| | 8-Hour | 111 | 4,000 | 4,111 | 10,000 | CAAQS | 41 |
| SO ₂ | 1-Hour | 19 | 73 | 92 | 655 | CAAQS | 14 |
| | 3-Hour | 12 | 63 | 75 | 1,300 | NAAQS | 6 |
| | 24-Hour | 5.5 | 47 | 52.5 | 105 | CAAQS | 50 |
| | Annual | 0.2 | 5 | 5.2 | 80 | NAAQS | 7 |
| H ₂ S | 1-Hour | 36 | 24.6 | 60.6 | 42 | CAAQS | 144 |

Source: SSU6 2002a. AFC Tables 5.1-40 (PM₁₀), 5.1-47 (H₂S), 5.1-54 (NO₂), 5.1-62 (CO), 5.1-73 (SO₂).

Note(s):

a. Background concentration values for this table and all other modeling result tables have been adjusted to the staff recommended values shown in **AIR QUALITY Table 9**.

b. The ozone limiting method (ISC3OLM) was used for 1-hour NO₂ concentrations. The ambient ratio method (factor 0.75) for rural areas was used for annual NO₂ concentrations.

As can be seen from the modeling results provided in **AIR QUALITY Table 22**, with the exception of 24-hour and annual PM₁₀ impacts and 1-hour H₂S impacts, construction impacts are below the state and national standards. It should be noted that the state 24-hour and annual PM₁₀ standards are exceeded in the absence of construction emissions from the SSU6 Project. Based on the applicant's modeling results the activities resulting in fugitive dust emissions exceed the 24-hour California PM₁₀ standard by a factor of 1.4 (72/50=1.44). The applicant has assumed an 80 percent control level based on U.S. EPA reference levels being applied to the proposed fugitive dust mitigation plan.

Staff remodeled the 1-hour H₂S construction emissions by increasing the stack height of the injection well testing stack from 38 feet to 80 feet as an attempted mitigation

measure¹. This change resulted in almost no improvement of the maximum modeled concentration (35 ug/m³ vs. 36 ug/m³). A review of the modeling results indicate that the modeled violations of the H₂S 1-hour standards would only occur within 900 meters of the injection well being tested and that many of the exceedances, including the eight highest modeled concentrations, occur within the elevated terrain of Obsidian Butte. The maximum 1-hour H₂S concentration in the approximate center of Calipatria was modeled to be 7.1 ug/m³.

Staff reviewed the applicant's modeling results and found that the modeling techniques and assumptions may over predict impacts from the fugitive dust emission sources and may under predict impacts from the equipment tailpipe PM₁₀ emission sources. Some of these assumptions and techniques used by the applicant are as follows:

1. The fugitive dust emissions were modeled as area sources.
2. Unpaved road emissions from site access and egress were assumed to occur for 1.73 miles per vehicle and those emissions were included in the onsite fugitive dust area source.
3. The equipment emissions were modeled as four point sources with extremely high exit velocities.

Staff remodeled the construction PM10 emissions by: 1) using volume sources distributed within the construction site to model the fugitive dust emissions; 2) Assuming that the access roads are paved at the beginning of construction (required under staff condition of certification AQ-C3) to eliminate the large quantity of unpaved road emissions and by not including the offsite paved road emissions as part of the onsite construction emissions; 3) using additional point sources with lower exhaust velocities to model the equipment exhaust emissions. Staff further remodeled the injection well testing stack from 38 feet to 80 feet as a mitigation measure. The results of staff's construction modeling analysis are provided in **AIR QUALITY Table 23**.

AIR QUALITY Table 23
Staff Construction Modeling Results

| Pollutant | Averaging Period | Project Impact (µg/m ³) | Background Concentration (µg/m ³) ^a | Total Impact (µg/m ³) | Limiting Standard (µg/m ³) | Type of Standard | Percent of Standard (%) |
|------------------|------------------|-------------------------------------|--|-----------------------------------|--|------------------|-------------------------|
| PM ₁₀ | 24-Hour | 39 | 115 | 154 | 50 | CAAQS | 308 |
| | Annual Geo. Mean | 4.7 | 38.6 | 53.3 | 30 | CAAQS | 178 |

Similar to the H₂S modeling results the peak 24-hour PM₁₀ modeling results show that the highest modeled impacts occur approximately 2/3rds of a mile from the center of the project site at elevated terrain within the Obsidian Butte area and that they are primarily due to the injection well flow emissions. The highest impacts from the construction equipment and construction fugitive dust sources occur at the project fence line and

¹ The increase in stack height to 80 feet was initially used as a mitigation measure for the operational impacts due to commissioning and plant startup. For plant site operating emission sources the use of a higher stack limits the effects of plume downwash, however, this mitigation measure is very effective for well testing operations since they are not conducted near structures that cause building downwash.

decrease rapidly with distance. The maximum 24-hour and annual modeled PM₁₀ impacts at the approximate center of the City of Calipatria from the SSU6 project construction are 3.41 ug/m³ and 0.06 ug/m³, respectively.

Staff will propose mitigation measures to mitigate onsite construction impacts and will suggest mitigation measures to mitigate the well drilling and well flow impacts.

OPERATION IMPACTS

The applicant modeled the emissions from operating activities including: (1) fugitive dust emissions from filter cake handling and operating/maintenance equipment, (2) non-condensable gases from the cooling towers, (3) offgassing at the cooling towers, (4) drift from the cooling towers, (5) dilution water heaters, (6) emergency generators and fire pump, and (7) operating/maintenance exhaust equipment. This analysis was completed using the ISCST3 model (Version 00101). The following modeling scenarios and assumptions were assumed to assess the impacts to ambient air quality standards (SSU6 2002a, p. 5.1-27 to 30):

- Filter cake handling activities (PM₁₀) were modeled as three volume sources (Silica and Sulfur Filter Cake Handling: two sources and one source, respectively, with Release Height=12 feet).
- Operations and maintenance equipment on paved and unpaved roads (PM₁₀) were modeled as ten area sources (Paved and Unpaved Roads: three sources and six sources, respectively, with Release Height=2 meters).
- Drift from the cooling towers (PM₁₀ and H₂S) was modeled as twenty point sources - one for each cell (H=58 feet, D=32 feet, V=33 fps). Stack temperatures vary by season and by brine throughput at the brine handling facilities (T_{summer}=96.1°F, T_{annual avg}=80.4°F, T_{winter}=72.6°F).
- Exhaust from dilution water heaters (PM₁₀, H₂S) was modeled as two point sources (H=45 feet, T=213.1°F, D=8 feet). Stack velocities vary by season and by brine throughput (V_{summer}=31.9 fps, V_{annual avg}=30.5 fps, V_{winter}=30.2 fps).
- Emergency generators and fire pump (PM₁₀, NO₂, SO₂, CO) were modeled as point sources (Emergency Generator 480: H=40 feet, T=793°F, D=0.67 feet, V=128 fps, Emergency Generator 4160: H=60 feet, T=963°F, D=1.5 feet, V=160 fps, Fire Pump: H=40 feet, T=855°F, D=0.5 feet, V=128 fps).
- Operations and maintenance equipment (PM₁₀, NO₂, SO₂, CO) were modeled as seventeen point sources. Five point sources were used to characterize the truck that transfers trailers from the filter cake handling area to the trailer storage area, and twelve point sources were used to characterize the other equipment operating in the main power plant area (H=12 feet, T=850°F, D=0.333 feet, V=298 fps).
- Stored filter cake (radon) was modeled as an area source (Release Height=12 feet, Area=2.38 acres) to determine the health risk impact to the nearest resident location under normal operating conditions. The nearest resident is located at the Sonny Bono National Wildlife Refuge, approximately 0.7 miles east-northeast of the fence line.

It should be noted that all operations impact analyses were based on the emissions shown in **AIR QUALITY Tables 13 through 15**. When the District issues their Final Determination of Compliance, the permit emission levels must be no greater than the emissions presented in this analysis in order for the impact assessment presented to remain valid.

Operational Modeling Analysis

The EPA approved ISCST3 model (Version 00101) was used to identify the potential ambient air quality impacts from the project's operation. The maximum hourly emissions, as provided in **AIR QUALITY Table 13**, were modeled for each pollutant to determine the short-term impacts (1-hour, 3-hour, 8-hour). The maximum daily and annual emissions, as provided in **AIR QUALITY Table 14 and 15**, were modeled to determine the daily and annual impacts.

AIR QUALITY Table 24 provides the results of the applicant modeling analysis.

AIR QUALITY Table 24
Applicant Operation ISC Modeling Results

| Pollutant | Averaging Period | Project Impact ($\mu\text{g}/\text{m}^3$) | Background Concentration ($\mu\text{g}/\text{m}^3$) ^a | Total Impact ($\mu\text{g}/\text{m}^3$) | Limiting Standard ($\mu\text{g}/\text{m}^3$) | Type of Standard | Percent of Standard (%) |
|------------------------------|------------------|---|--|---|--|------------------|-------------------------|
| NO ₂ ^b | 1-Hour | 209 | 180 | 389 | 470 | CAAQS | 83 |
| | Annual | 0.5 | 19 | 19.5 | 100 | NAAQS | 20 |
| PM ₁₀ | 24-Hour | 2.3 | 115 | 117.3 | 50 | CAAQS | 235 |
| | Annual Geometric | 0.3 | 38.6 | 38.9 | 30 | CAAQS | 130 |
| CO | 1-Hour | 1,121 ^c | 8,000 | 9,121 | 23,000 | CAAQS | 40 |
| | 8-Hour | 458 ^c | 4,000 | 4,458 | 10,000 | CAAQS | 45 |
| SO ₂ | 1-Hour | 22 ^c | 73 | 95 | 655 | CAAQS | 15 |
| | 3-Hour | 16 ^c | 63 | 79 | 1,300 | NAAQS | 6 |
| | 24-Hour | 7.0 ^c | 47 | 54 | 105 | CAAQS | 51 |
| | Annual | 0.08 | 5 | 5.1 | 80 | NAAQS | 6 |
| H ₂ S | 1-Hour | 7.5 | 24.6 | 32.1 | 42 | CAAQS | 76 |

Source: SSU6 2002a, Tables 5.1-43 (PM₁₀), 5.1-49 (H₂S), 5.1-57 (NO₂), 5.1-65 (CO), and 5.1-78 (SO₂).

Note(s):

- a. Background concentration values for this table and all other modeling result tables have been adjusted to the staff recommended values shown in **AIR QUALITY Table 9**.
- b. The applicant lists only one diesel engine in the 1-hour modeling runs because the other two will not be tested while the original one is tested. A screening analysis indicated that the fire pump engine generated the highest NO₂ concentrations. The ambient ratio method (factor 0.75) for rural areas was used for annual NO₂ concentrations.
- c. These values were determined through a review of the modeling output files provided by the applicant, which conflict with the CO and SO₂ concentration data given in AFC Tables 5.1-63, 64 for CO and Tables 5.1-74 to -76 for SO₂.

As can be seen from the modeling results provided in **AIR QUALITY Table 24**, with the exception of 24-hour and annual PM₁₀ impacts, operations impacts are below the state and national standards. It should be noted that the state 24-hour and annual PM₁₀ standards are exceeded in the absence of operations emissions from the SSU6 Project.

The project's PM₁₀ 24-hour concentration provided in **AIR QUALITY Table 24** is the maximum concentration found any time during the year and most likely does not

correspond to the same day as the maximum PM₁₀ background concentration shown in the table. Additionally, the ambient conditions that normally cause high PM₁₀ concentrations (high winds during dry periods or low inversion conditions during cold periods) are not the same as the conditions under which maximum PM₁₀ impacts from the project would occur. Although the PM₁₀ impacts are quite small, because the Salton Sea Air Basin is classified as non-attainment for PM₁₀ and violations of the state and federal ambient air quality standards continue to occur, staff considers the project PM₁₀ emissions impacts, without appropriate mitigation, to be significant.

The SSU6 Project operating impacts would not cause a new violation of any NO₂, CO, SO₂, or H₂S ambient air quality standard. The PM₁₀ impacts from the operation of the SSU6 Project would cause a further exacerbation of violations of the state and federal PM₁₀ standards. Offsets will be provided for the net increase in PM₁₀ emissions from the project.

Potential Temporary Activities Impacts

The applicant modeled the emissions from temporary activities and processes including: (1) well rework/new well drilling, (2) well flow activities, (3) steam vent tanks, and (4) plant startup. This analysis was completed using the ISCST3 model (Version 02035). The following modeling scenarios and assumptions were assumed to assess the impacts to ambient air quality standards (SSU6 2002a, p. 5.1-30 to 33):

- Well rework/new well drilling activities (emissions of PM₁₀, NO₂, SO₂, CO) were modeled using the same inputs and short term emissions as presented for construction impact modeling. Only one well/rig was evaluated (H=14 feet, T=855°F, D=1.33 feet, V=112 fps).
- Well flow activities (PM₁₀ and H₂S) were modeled using the same inputs and short term emissions as presented for construction impact modeling (Production Flow Run: One source with H=50 feet, T=226.7°F, D=9 feet, V=40 fps. Injection Flow Run: Five sources with H=37.92 feet, T=226.7°F, D=6 feet, V=48.7 fps).
- Steam vent tank releases (i.e. turbine bypass conditions) are expected to occur at the low and standard steam vent tanks and at the cooling towers and dilution water heaters.
- The Low Pressure (LP) Steam Vent Tank (PM₁₀ and H₂S) was modeled as one point source (H=60 feet, T=246.1°F, D=10 feet). Stack velocities vary by season and by brine throughput (V_{summer}=81.5 fps, V_{annual avg}=77.3 fps, V_{winter}=76.4 fps).
- The Standard Pressure (SP) Steam Vent Tank (PM₁₀ and H₂S) was modeled as one point source (H=60 feet, T=298.9°F, D=10 feet). Stack velocities vary by season and by brine throughput (V_{summer}=68.9 fps, V_{annual avg}=65.5 fps, V_{winter}=64.7 fps).
- The cooling towers (PM₁₀ and H₂S) were modeled as twenty point sources - one for each cell (H=58 feet, D=32 feet, V=33.1 fps). Stack temperatures vary by season and by brine throughput (T_{summer}=90.3°F, T_{annual avg}=72.8°F, T_{winter}=63.7°F).
- The dilution water heaters (PM₁₀, H₂S) were modeled as two point sources (H=45 feet, T=213.1°F, D=8 feet). Stack velocities vary by season and by brine throughput (V_{summer}=31.9 fps, V_{annual avg}=30.5 fps, V_{winter}=30.2 fps).

- In cold plant startup conditions, emissions are expected to occur mainly at the Production Test Unit (PTU) and steam vent tanks. Emissions from the cooling towers and dilution water heaters were also considered.
- The PTU (PM_{10} and H_2S) was modeled as one point source (H=50 feet, T=226.7°F, D=9 feet, V=40 fps).
- The cooling towers (PM_{10} and H_2S) were modeled as twenty point sources - one for each cell (H=58 feet, D=32 feet, V=33.1 fps). Stack temperatures vary by season and by brine throughput ($T_{summer}=90.3^\circ F$, $T_{annual\ avg}=72.8^\circ F$, $T_{winter}=63.7^\circ F$).
- The LP Steam Vent Tank (PM_{10} and H_2S) was modeled as one point source (H=60 feet, T=246.1°F, D=10 feet). Stack velocities vary by season and by brine throughput ($V_{summer}=5.71\ fps$, $V_{annual\ avg}=5.41\ fps$, $V_{winter}=5.35\ fps$).
- The SP Steam Vent Tank (PM_{10} and H_2S) was modeled as one point source (H=60 feet, T=298.9°F, D=10 feet). Stack velocities vary by season and by brine throughput ($V_{summer}=4.82\ fps$, $V_{annual\ avg}=4.59\ fps$, $V_{winter}=4.53\ fps$).
- The dilution water heaters (PM_{10} and H_2S) were modeled as two point sources (H=45 feet, T=213.1°F, D=8 feet). Stack velocities vary by season and by brine throughput ($V_{summer}=2.23\ fps$, $V_{annual\ avg}=2.14\ fps$, $V_{winter}=2.11\ fps$).

AIR QUALITY Table 25 provides the results of the applicant modeling analysis. It should be noted that all operations impact analyses were based on the emissions shown in **AIR QUALITY Tables 16 through 19**.

AIR QUALITY Table 25
Applicant Temporary Activities ISC Modeling Results

| Pollutant | Source | Averaging Period | Project Impact ($\mu\text{g}/\text{m}^3$) | Background Concentration ($\mu\text{g}/\text{m}^3$) ^a | Total Impact ($\mu\text{g}/\text{m}^3$) | Limiting Standard ($\mu\text{g}/\text{m}^3$) | Type of Standard | Percent of Standard (%) |
|------------------|------------------|------------------|---|--|---|--|------------------|-------------------------|
| NO ₂ | Well Rework | 1-Hour | 236 | 180 | 416 | 89 | CAAQS | 83 |
| PM ₁₀ | Well Rework | 24-Hour | 3.5 | 115 | 118.5 | 50 | CAAQS | 237 |
| | Well Flow | 24-Hour | 41 | 115 | 156 | 50 | CAAQS | 312 |
| | Steam Vent Tanks | 24-Hour | 20 | 115 | 135 | 50 | CAAQS | 270 |
| | Plant Startup | 24-Hour | 33 | 115 | 148 | 50 | CAAQS | 296 |
| CO | Well Rework | 1-Hour | 82 | 8,000 | 8,082 | 23,000 | CAAQS | 35 |
| | Well Rework | 8-Hour | 31 | 4,000 | 4,031 | 10,000 | CAAQS | 40 |
| SO ₂ | Well Rework | 1-Hour | 18.9 | 73 | 91.9 | 655 | CAAQS | 14 |
| | Well Rework | 3-Hour | 12 | 63 | 75 | 1,300 | NAAQS | 6 |
| | Well Rework | 24-Hour | 2.4 ^b | 47 | 49.4 | 105 | CAAQS | 47 |
| H ₂ S | Well Flow | 1-Hour | 35 | 24.6 | 59.6 | 42 | CAAQS | 142 |
| | Steam Vent Tanks | 1-Hour | 7.8 | 24.6 | 32.4 | 42 | CAAQS | 77 |
| | Plant Startup | 1-Hour | 22 | 24.6 | 46.6 | 42 | CAAQS | 111 |

Source: SSU6 2002a, Tables 5.1-45 (PM₁₀), 5.1-51 (H₂S), 5.1-59 (NO₂), 5.1-68 (CO), and 5.1-82 (SO₂).

Note(s):

- a. Background concentration values for this table and all other modeling result tables have been adjusted to the staff recommended values shown in **AIR QUALITY Table 9**.
- b. This value was determined through a review of the modeling output files provided by the applicant, which conflicts with the value presented in AFC Table 5.1-81 (2.8 $\mu\text{g}/\text{m}^3$).

As can be seen from the modeling results provided in **AIR QUALITY Table 25**, with the exception of 24-hour PM₁₀ and 1-hour H₂S impacts, impacts from temporary activities are below the state and national standards. It should be noted that the state 24-hour PM₁₀ standard is exceeded in the absence of emissions from temporary activities from the SSU6 Project. Impacts from temporary activities, in and of themselves, do not exceed the California 1-hour H₂S standard. Including the maximum background concentrations, both well flow and plant startup activities exceed the California 1-hour H₂S standard.

Although the SSU6 Project PM₁₀ impacts are quite small, because the Salton Sea Air Basin is classified as non-attainment for PM₁₀ and violations of the state and federal ambient air quality standards continue to occur, the project PM₁₀ emissions impacts are, without appropriate mitigation, significant.

The SSU6 Project H₂S and PM₁₀ impacts are similar in nature to the construction impacts. The maximum concentrations generally occur close to the project site and within the elevated terrain of the Obsidian Butte area. The maximum H₂S concentrations modeled near the center of Calipatria were found to be as high as 10.9 $\mu\text{g}/\text{m}^3$, lower than the maximum concentrations shown in Table 25, and are not predicted to result in exceedances of the state 1-hour H₂S standards. Additionally, the use of higher stacks as a mitigation measure for the higher H₂S emitting steam exhaust

sources will limit the areas impacted with concentrations that are potentially above the state 1-hour standard, will prevent new violations of the 1-hour H₂S standard during startups, and will minimize the 24-hour PM₁₀ impacts.

Fumigation Impacts

There is the potential that higher short-term concentrations may occur during fumigation conditions that are caused by the rapid mixing of the plume to ground level. Fumigation conditions are generally only compared to 1-hour standards. The applicant analyzed the air quality impacts during inversion breakup fumigation conditions from the project site. Inversion breakup fumigation typically occurs at sunrise, when sunlight heats ground-level air, resulting in vertical mixing with the stable, early morning air above it. Pollutant emissions that enter this vertically mixed volume of air can cause high concentrations of pollutant at ground level. This phenomenon usually ceases 30 to 90 minutes after sunrise.

The EPA model SCREEN3 (Version 96043) was used by the applicant to estimate potential impacts due to inversion breakup fumigation conditions. The results of the analysis, estimated for the worst-case operating conditions, are summarized in **AIR QUALITY Table 26**.

AIR QUALITY Table 26
SSU6 Project Maximum Inversion Breakup Fumigation Impacts
Applicant SCREEN3 Modeling, 1- Hour Results

| Pollutant | Source | Maximum Impact (µg/m ³) | Background (µg/m ³) | Total Impact (µg/m ³) | Limiting Standard (µg/m ³) | Type of Standard | Percent of Standard (%) |
|------------------|---------------------------------------|-------------------------------------|---------------------------------|-----------------------------------|--|------------------|-------------------------|
| NO ₂ | Emergency Generator 4160 ^a | 61.4 | 180 | 241.4 | 470 | CAAQS | 51 |
| H ₂ S | Cooling Tower Cell | 2.17 | 24.6 | 26.77 | 42 | CAAQS | 64 |
| | Dilution Water Heater | 1.02 | 24.6 | 25.62 | 42 | CAAQS | 61 |

Source: SSU6 2002a, Table G-20, Appendix G.2.

Note(s):

a. No fumigation was predicted to occur by SCREEN3 for emergency generator 480 or the fire pump because of their shorter plume heights.

As the above table indicates, the fumigation impacts would not exceed applicable 1-hour California Ambient Air Quality Standards (CAAQS). Fumigation impacts for the cooling tower cells, water heaters, and emergency generator 4160 were predicted to occur at 5224, 3440, and 2708 meters from each respective source (SSU6 2002a, p. 5.1-34). The modeled 1-hour fumigation impacts for each of these individual sources were compared to the maximum impacts determined in the applicant's ISCST3 analyses. Fumigation impacts were less than the ISCST3 maximums. Therefore, fumigation will not significantly affect the overall results of the modeling analyses.

Secondary Pollutant Impacts

The project's emissions of gaseous pollutants, primarily NO_x, SO₂, VOC, and NH₃ can potentially contribute to the formation of secondary pollutants, namely ozone and PM₁₀, particularly ammonium nitrate and sulfate/bisulfate PM₁₀.

The formation of ozone can potentially occur due to the emissions of NO_x and VOC. For the SSU6 Project, the total NO_x annual emissions from plant operations are expected to be below 3.7 tons per year, and VOC emissions below 2.2 tons per year; and the annual estimated temporary operations (well redrilling/flow testing and startup emissions) NO_x and VOC emissions are expected to be 6.9 tons per year and <1 ton per year, respectively.

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the model over an area of several hundred or thousand square miles to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NO_x and VOC emissions to ozone formation, it can be said that the unmitigated emissions of NO_x and VOC from the SSU6 project do have the potential to contribute in some minor unquantified way to higher ozone levels in the region. However, the controlled NO_x and VOC emission levels proposed by the applicant are not expected to measurably contribute to ozone concentrations or deter the District's ozone attainment progress.

Concerning secondary PM₁₀ (primarily ammonium nitrate) formation, the process of gas-to-particulate conversion is complex and depends on many factors, including local humidity and the presence of other compounds that participate in or aid the reactions that form secondary particulate. Currently, there is not an agency (EPA or CARB) recommended model or procedure for estimating secondary particulate formation.

Secondary PM₁₀ impacts can occur due to emissions of ammonia and NO_x, causing ammonium nitrate formation. Studies have indicated a conversion of NO_x to nitrate of approximately 10 to 30 percent per hour in a polluted environment (SSU6 2002a, p. 5.1-44). Because the project area is not considered a polluted environment like the South Coast Air Basin (i.e. Los Angeles area) or the San Joaquin Valley Air Basin, the applicant assumed a 10 percent per hour conversion rate. At this rate, with the time from the emissions source to the receptor with the maximum modeled 24-hour NO_x concentration being calculated by the applicant to be 73 seconds, a total of 0.20 percent (10 percent times 73/3600 seconds) of the NO_x would be converted to particulate matter at this receptor location. The maximum modeled 24-hour NO_x concentration was determined to be 94 µg/m³, therefore the applicant calculates that the maximum 24-hour PM₁₀ impact from ammonium nitrate would be 0.19 µg/m³. This concentration is based on the assumption that the diesel fired emergency generators and all of the operations and maintenance equipment are operating continuously for 24 hours. The applicant believes a more realistic scenario would reduce the emissions 10 to 20 times (0.02 to 0.01 µg/m³ PM₁₀ formation). Staff is not sure that this approach determines the maximum potential ammonium nitrate secondary particulate impact for two reasons: 1) the modeled NO_x concentrations at more distant receptors may not decrease at a rate

that is greater over time than the increase in the secondary PM₁₀ conversion rate; and 2) the applicant has not corrected for the higher molecular weight of ammonium nitrate, which accepting their calculation method should result in a calculated 24-hour ammonium nitrate concentration of 0.33 µg/m³. Staff also believes that the applicant is neglecting the role of the project's significant ammonia emissions in secondary PM₁₀ formation and its potential impact when it is dispersed towards the more polluted border region of Imperial County.

Secondary PM₁₀ impacts can also occur due to emissions of SO₂ and VOC. As noted above the VOC emissions are minor and are not expected to generate a significant impact. The total emissions of SO₂ are expected to be below 1 ton per year and will be substantially less if ultra-low sulfur fuel is used in all diesel-fueled equipment. Therefore, the conversion of SO₂ to sulfate/particulate matter is anticipated to be an insignificant impact.

H₂S emissions may also contribute to secondary particulate formation through the oxidation of H₂S and further reaction to sulfate salts. However, the applicant will be offsetting the SSU6 normal operating H₂S emissions at a 1.2:1.0 ratio using local contemporaneous emission reductions from the Elmore or Leathers plants. Therefore, there will be a net reduction in H₂S emissions, and an assumed net reduction in H₂S based secondary particulate formation.

Staff believes that the emissions of NO_x, SO_x, VOC, and particularly ammonia from the SSU6 project have the potential to contribute to higher secondary PM₁₀ (particularly ammonium salt) levels in the region. However, with appropriate PM₁₀ and/or PM₁₀ precursor offsets staff believes that these impacts from NO_x, SO_x, and VOC can be mitigated to insignificant levels. However, the project's ammonia emissions are too high to be fully mitigated by the use of offsets. Staff will determine if feasible emission control strategies for the ammonia emissions exist and will present those findings in the Final Staff Assessment. Two technologies that will be researched are the Z-XMTM ammonia removal process licensed by Water Remediation Technologies, LLC., and reverse osmosis membrane technologies.

Initial Commissioning

Plant commissioning is expected to occur after the completion of construction, and therefore is not expected to be combined with any other activity. Commissioning is a temporary activity occurring only one time. The commissioning emissions are comprised of steam venting sources, with no fuel combustion sources being active. Therefore, the applicant modeled 1-hour H₂S impacts and 24-hour PM₁₀ impacts only.

Plant commissioning emissions are emitted from three sources, the production test unit (PTU), the steam vent tanks, and the dilution water heaters. The following modeling scenarios and assumptions were assumed to assess the impacts to ambient air quality standards (SSU6 2002a, p. 5.1-26 to 27, Tables G-5.3 to 5.6):

Scenarios

1. One well venting at the PTU while seven wells emit at the steam vent tanks.
2. All nine wells releasing at the steam vent tanks.

3. Individual steam blows during the steam blow period with the steam vent tanks releasing the remaining steam.

Assumptions

- PTU (Scenario #1) was modeled as one point source (H=50 feet, T=226.7°F, D=9 feet, V=40 fps).
- LP Steam Vent Tank (Scenarios #1,2,3) was modeled as one point source (H=60 feet, T=246.1°F, D=10 feet, V=39.9 fps).
- SP Steam Vent Tank (Scenarios #1,2,3) was modeled as one point source (H=60 feet, T=298.9°F, D=10 feet, V=33.8 fps).
- HP Steam Vent Tank (Scenarios #1,2,3) was modeled as two point sources (H=60 feet, T=322.2°F, D=10 feet, V=39.2 fps).
- Dilution Water Heaters (Scenarios #1,2,3) was modeled as two point sources (H=45 feet, T=213.1°F, D=8 feet, V=15.6 fps).
- HP Steam Blows (Scenario #3a) was modeled as one point source (H=40 feet, T=322°F, D=2.50 feet, V=287 fps). Half the high pressure steam is routed to the steam blow, one HP vent tank will remain in full operation.
- SP Steam Blows (Scenario #3b) was modeled as one point source (H=40 feet, T=299°F, D=2.50 feet, V=194.6 fps). Half the standard pressure steam is routed to the steam blow, the SP vent tank will be in half load operation.
- LP Steam Blows (Scenario #3c) was modeled as one point source (H=40 feet, T=246°F, D=3.0 feet, V=315.9 fps). Half the low pressure steam is routed to the steam blow, the LP vent tank will be in half load operation.

AIR QUALITY Table 27 provides the results of the applicants modeling analysis for maximum PM₁₀ and H₂S emissions during commissioning.

AIR QUALITY Table 27
Commissioning Modeling Analysis Results

| Pollutant | Averaging Period | Project Impact (µg/m ³) | Background (µg/m ³) | Total Impact (µg/m ³) | Limiting Standard (µg/m ³) | Type of Standard | Percent of Standard (%) |
|------------------|------------------|-------------------------------------|---------------------------------|-----------------------------------|--|------------------|-------------------------|
| PM ₁₀ | 24-Hour | 33 | 115 | 148 | 50 | CAAQS | 296 |
| H ₂ S | 1-Hour | 148 | 24.6 | 172.6 | 42 | CAAQS | 411 |

Source: SSU6 2002a. Tables 5.1-40 (PM₁₀) and 5.1-47 (H₂S).

Note(s):

a. Scenario #1 generated the highest concentrations of PM₁₀. Scenario #3a generated the highest concentrations of H₂S.

As can be seen from the modeling results provided in **AIR QUALITY Table 27**, the commissioning 24-hour PM₁₀ and 1-hour H₂S impacts exceed the ambient air quality standards and are therefore significant. Peak plant commissioning emissions exceed the California 1-hour H₂S standard by a factor of 3.5 (148/42=3.52). Plant commissioning activities are anticipated to last about 14 days.

Staff's review of the modeling results indicates that the maximum emission impacts occur under high wind periods partially due to fairly low stacks and building downwash.

Staff remodeled the 1-hour H₂S impacts after raising the main steam exhaust stacks to 80 feet and determined that the impacts would be lowered from the originally modeled 148 µg/m³ to 67 µg/m³. Like the construction and temporary emission source modeling, the maximum impacts found during commissioning occur either very close to the site or at elevated terrain. The maximum impacts were again found to occur in the elevated terrain of the Obsidian Butte area, just to the west of the project site. Staff's modeling analysis indicates that the maximum impacts near the center of the City of Calipatria would be approximately 32.3 µg/m³. It should be noted that this concentration is above the lower odor threshold (approximately 10 µg/m₃) and could cause a nuisance in and around the City of Calipatria. This is considered to be a potentially significant impact. Staff will be working with the District and the applicant to address this issue and to determine appropriate mitigation measures. Additionally, staff may perform or ask the applicant to perform additional refined modeling analyses of the commissioning emissions.

At this time staff is recommending that temporary stacks be used during commissioning and plant startup to reduce the impacts that will occur during commissioning and other high emitting temporary operations. However, these mitigation measures will not reduce the impacts from the initial commissioning phase to a level of less than significant.

VISIBILITY IMPACTS

The applicant performed air quality modeling analyses to determine impacts to the nearest Class I area. Joshua Tree National Park is located 56.2 to 126.5 kilometers northwest to north-northeast from the closest portion of the SSU6 Project (well pad OB1/N). The CALPUFF Modeling System, operating in a screening mode, was used to assess the potential impacts of the SSU6 Project on air quality concentrations, visibility, and deposition rates for nitrogen- and sulfur-containing species (SSU6 2002a, p. 5.1-40 to 43).

CALPUFF predicted maximum concentrations to be less than one percent of the PSD Class I increments for all pollutants. Because the maximum impacts modeled by the applicant were less than the proposed U.S. EPA Class I significant impact levels, no additional multisource modeling analyses were required. For visibility, the CALPOST program (the CALPUFF post processing program) predicted the maximum change in light extinction to be less than the 5 percent screening threshold. Therefore, the proposed project does not pose a threat to regional haze at Joshua Tree National Park. For deposition, the CALPOST program predicted nitrogen and sulfur deposition rates lower than the FLAG threshold of 0.005 kilograms per hectare per year for each compound. Therefore, the applicant does not consider the deposition impacts from the proposed project to be significant.

The project would also emit a large quantity of ammonia that could affect visibility. However, considering that the predominate wind direction is away from the nearest Class I areas and the distance to the nearest Class I area is over 50 kilometers, staff expects no significant visibility impacts to occur as a result of the SSU6 Project.

MITIGATION

Construction Mitigation

As described in the applicable LORS section, District Rule 800 limits fugitive dust during the construction phase of a project. Staff will recommend that construction emission impacts be mitigated to the greatest feasible extent including all feasible measures from the LORS, as well as, other measures considered necessary by staff to fully mitigate the construction emissions.

Applicant's Proposed Mitigation

The applicant has proposed to implement the following construction mitigation measures (SSU6 2002a, p. 5.1-45 to 47):

Fugitive Dust Suppression Program (Construction)

- Watering of unpaved roads and disturbed areas at least twice per day
- Limiting speed of vehicles in construction areas to 10 miles per hour or less.
- Increase watering frequency when wind speeds exceed 15 miles/hour.
- Prior to soil disturbance, install windbreaks at the windward sides on construction areas. The windbreaks shall remain in place until the soil is either stabilized or permanently covered.
- Pre-wet soil to be excavated.
- Fifteen minutes prior to soil handling, spray soil with water.
- Cover all trucks hauling dirt, sand, soil or other loose materials and maintain at least 6 inches freeboard between the top of the load and the top of the trailer.
- Maintain cargo compartments so that no spillage or loss of material can occur.
- Clean cargo compartments for all haul trucks at the delivery site, after removal of materials.
- Prior to entering a public roadway, employ tire cleaning and gravel ramps to limit accumulated mud and dirt deposited on the roads.
- Cleanup of spillage and material tracked out or carried out into a paved road surface within 48 hours.
- Sweep public roadways that are used by construction and worker vehicles at least twice a day using dust-sweeping vehicles.
- Sweep newly paved roads at least twice a week.

Well Drilling Construction Emissions

Contractors will be hired by the applicant to conduct well drilling activities. These contractors will be required to have Statewide Portable Equipment Registrations

(SPER) issued by CARB or be permitted by Imperial County APCD for their diesel fueled engines. Typical SPER requirements for these types of engines include:

- Engines shall be equipped with turbocharger and aftercoolers.
- The opacity shall be limited to 20 percent or less.
- PM₁₀ emissions shall be limited to less than 0.1 grain per dry standard cubic feet (DSCF) corrected to 12 % CO.
- Limit engine idling time to no more than five minutes and shutdown equipment when not in use.
- Limits on fuel use.

Heavy Duty Diesel Construction Equipment

- Limit engine idling time to no more than five minutes and shutdown equipment when not in use.
- Perform regular preventive maintenance to prevent emission increases due to engine problems.
- Use low-sulfur fuel meeting California standards for motor vehicle diesel fuel.

Staff Proposed Mitigation

Staff is recommending construction PM₁₀ emission mitigation measures that include some of the mitigation measures proposed by the applicant and several additional construction PM₁₀ emission mitigation measures and compliance assurance measures in Conditions of Certification **AQ-C1** through **AQ-C4**.

Staff recommends **AQ-C1** to require the applicant to have an on-site construction mitigation manager, who will be responsible for the implementation and compliance of the construction mitigation program. A construction mitigation plan is required to be submitted for approval under staff's recommended Condition of Certification **AQ-C2**. The documentation of the ongoing implementation and compliance with the construction mitigation program would be provided in the monthly construction compliance report.

Staff recommends PM₁₀ mitigation measures be provided in Condition of Certification **AQ-C3**. **AQ-C3** includes the following revisions and additions to the fugitive dust mitigation measures proposed by the applicant.

- All large construction diesel engines, which have a rating of 100 hp or more, shall meet, at a minimum, the 1996 ARB or EPA certified standards for off-road equipment
- All large construction diesel engines, which have a rating of 100 hp or more, shall be equipped with catalyzed diesel particulate filters (soot filters), unless certified by engine manufacturers or the on-site AQCM that the use of such devices is not practical for specific engine types.
- The requirement to use ultra low sulfur diesel (ULSD) fuel.
- Paving of all major access/egress routes to the project site and requiring construction workers and deliveries to take paved routes to and from the project site.

- Suspension of fugitive dust causing activities under windy (i.e. sustained winds >25 mph) conditions;
- Incorporation of ICAPCD fugitive dust regulation requirements.

Staff recommends Conditions of Certification **AQ-C4** to limit visible emissions from construction activities at the construction sites, and limit the project related construction visible emissions from occurring within 100 feet of occupied structures.

Staff further recommends that the appropriate responsible agencies impose the following mitigation measures for well drilling and well flow emissions:

- The well flow testing shall be completed as expeditiously as possible.
- In locations where plume downwash may occur the well flow testing stacks shall be a minimum of 80 feet tall in order to ensure maximum dispersion of the well flow testing exhaust emissions.
- Well drilling activities shall use engines that meet or exceed 1996 off-road engine emission standards, and where appropriate the use of catalyzed diesel particulate filters shall be required.
- Well drilling diesel engines shall be required to use ultra-low sulfur diesel fuel.

Adequacy of Proposed Mitigation

Staff believes that the construction air quality impacts will be less than significant with the implementation of the recommended mitigation measures.

Operations Mitigation

Applicant's proposed mitigation

The applicant has proposed to implement the following operation activity mitigation measures (SSU6 2002a, p. 5.1-45 to 47):

Fugitive Dust Suppression Program (Operations)

- All access and internal power plant roads shall be paved with asphalt.
- Limit vehicle speeds and water unpaved access roads to well pads.
- Direct load haul truck with recently dewatered filter cake.
- Use wind break shield or structure at filter cake discharge point.
- Cover all trucks hauling filter cake or other geothermal materials and maintain at least 6 inches of freeboard between the top of the load and the top of the trailer.
- Maintain cargo compartments so that no spillage or loss of material can occur.
- Clean cargo compartments for all haul trucks at the delivery site, after removal of materials.
- Prior to entering a public roadway, employ tire cleaning and gravel ramps to limit accumulated mud and dirt deposited on the roads.

- Cleanup of spillage and material tracked out or carried out into a paved road surface within 48 hours.
- Designate a person to oversee the implementation of the fugitive dust control program.
- Treat the entrance roadways to the construction site with soil stabilization compounds.
- To prevent run-off, place sandbags adjacent to roadways.
- Limit equipment idle times to no more than five minutes.
- Employ electric motors for construction equipment when feasible.
- Apply covers or dust suppressants to soil storage piles and disturbed areas that remain inactive for more than two weeks.
- Replace ground cover in disturbed areas as quickly as possible.

Well Flow Testing Mitigation Measures

The brine from a flow test is routed to a well test unit designed to minimize the release of entrained brine, which contributes to the particulate matter and metals release. Other mitigation measures include:

- Flow rates shall be limited to 1,200,000 lb/hr.
- Flow tests shall last less than 96 hours.

Cooling Tower Mitigation Measures

- H₂S shall be controlled using a LO-CAT System with a control efficiency of 99.5 percent (SSU6 2002a, Appendix G.3).
- Benzene shall be controlled using carbon absorbers with a control efficiency of 95 percent (SSU6 2002a, Appendix G.3).
- Offgassing of H₂S shall be minimized using oxidizers designed to oxidize at least 95 percent of the H₂S in the condensate.
- The cooling tower shall be designed and built such that the eliminator drift rate does not exceed 0.0005 percent (SSU6 2002b, DR#5)
- Hexavalent chromium containing compounds will not be used in the circulating water.

Filter Cake Handling Mitigation Measures

- Direct load filter cake into trucks, trailers or bins as it is generated.
- Tarp trailer and bins immediately after loading.
- Use sulfate scale inhibitors to minimize radioactivity from radium (Ra226 and Ra228) and radon from the silica filter cake.

Emergency Generators/Fire Pump Mitigation Measures

- Internal combustion engines shall be equipped with turbochargers and aftercoolers.

- Emergency generators shall meet BACT for NO_x emissions of 6.9 grams/bhp.
- Fuel sulfur level shall be limited to less than 0.05 percent.

Operating and Maintenance Equipment Mitigation Measures

- Equipment shall meet applicable road or non-road 2001 emissions standards.
- Engines will be maintained according to manufacturer's recommendations per a regular engine maintenance schedule.

The applicant proposes additional mitigation measures to reduce emissions (SSU6 2002b, DR #7a-e):

- Use of gasoline for dump trucks, water trucks and boom trucks.
- Any trucks idling more than five minutes will be shut off.
- Regularly used on-site and off-site roads and loading pads will be paved and maintained (cleaning, etc.) to minimize fugitive dust emissions.
- Engines will be maintained according to manufacturer's recommendations per a regular engine maintenance schedule.

Emissions Controls

As discussed in the facility description section, the applicant will apply air pollution control equipment to limit the project's emission levels. To reduce H₂S emissions, the applicant proposes to use a LO-CAT System with a control efficiency of 99.5 percent in the cooling towers, and oxidizers designed to oxidize at least 95 percent of the H₂S in the condensate. To reduce benzene emissions, the applicant proposed to use carbon absorbers with a control efficiency of 95 percent. To reduce PM₁₀, the applicant proposes to use appropriate cooling tower drift control technology to reduce the drift rate to 0.0005 percent.

The ICAPCD has found the following equipment to be BACT for the SSU6 Project (District 2003):

- LO-CAT System and Biofilter Oxidizer to control H₂S from the non-condensable gas stream and the condensate stream, respectively.
- Carbon adsorption system to control benzene emissions from the non-condensable gas stream.
- High efficiency mist eliminators rated at 0.0005% drift control to control the PM₁₀ emissions from the cooling tower.
- Diesel standby generators and fire pump engine BACT determined to be 6.9 grams/BHP for NO_x control, complete combustion technology for PM₁₀ control, and use of CARB diesel fuel for SO₂ emissions control.

While ammonia is not a regulated criteria pollutant under federal, state or local air quality regulations, it is a known PM₁₀ precursor. Therefore, staff asked the applicant to provide a discussion of potential control technologies for the over 2,750 tons per year of anticipated ammonia emissions. The applicant responded to this in a revised data

response to data request #3 that there are two technically feasible measures. The first would be to replace the project's condensate water, used in the cooling tower, with other water sources that would increase local water use by approximately 8,600 acre feet per year and increase operating costs by approximately \$3,000,000 per year. Considering the water supply and water demand in the project area, this is not a preferred option. However, if and when a tertiary treated waste water source were to become available this option should be investigated further.

The second method would be to control the ammonia in the condensate before it reaches the cooling tower. This technique includes vacuum degasifier(s), ammonia-hydrochloric acid scrubber(s), weak acid cation exchangers, and would require the disposal of over 3 tons of ammonium chloride for every ton of ammonia controlled. The capital and operating cost of this technology was estimated by the applicant to be \$2,000,000 and over \$3,000,000 per year, respectively. Considering the cost and that this is an unproven technology not achieved in practice, staff does not consider it to be BACT for this project.

At this time, staff has no recommendation as to how to limit or control the ammonia emissions from the SSU6 project. However, staff will investigate if other potential ammonia control measures could be used and will provide any new information in the Final Staff Assessment.

Emission Offsets

The applicant is required by the District's New and Modified Stationary Source Review Rule (Rule 207) to provide emission offsets for NO_x, CO, SO_x, PM₁₀ and VOC emissions equal to or exceeding 137 lbs/day. Based on the total annual operating emissions estimated by the applicant (**AIR QUALITY Table 16**), none of the pollutants exceed the 137 lbs/day threshold, as shown in **AIR QUALITY Table 28**.

AIR QUALITY Table 28
Total Normal Operating Emissions

| Pollutant | Tons/Year | Lbs/Day^a (annual average) |
|------------------|------------------|---|
| NO _x | 3.7 | 20.3 |
| CO | 10.24 | 56.1 |
| VOC ^b | 2.24 | 12.3 |
| SO ₂ | 0.43 | 2.4 |
| PM ₁₀ | 13.71 | 75.1 |

Source: SSU6 2002b, Revised Table G-13. SSU6 2003a, Data Request Response #113 (VOCs).

Note(s):

a. Assume 365 days/year

b. Cooling tower non-condensable VOC emissions based on 0.176 lb/hr benzene, 0.00485 lb/hr toluene, 0.000594 lb/hr xylenes (Table G-6), and 0.194 lb/hr VOCs (SSU6 2003a, DR #113).

The annual average daily emissions are much less than the maximum daily emissions reported by the applicant, as shown in **AIR QUALITY Table 14**. The applicant chose to take an annual approach because of the many intermittent operating sources. This approach follows the intent of District Rule 101, *Definitions for Potential Emissions*, where potential emissions are defined as "the sum of the maximum emissions from all

emission units at a stationary source, based on the maximum design capacity...expressed in terms of pounds per quarter.” Pursuant to Rule 207, emissions for PM₁₀ and SO_x are determined by multiplying the permitted emission level, in pounds per day, by the permitted operating days per quarter. It should be noted that even if the startup emissions were included in one quarter the average daily emission of all pollutants would still remain below the offset threshold (the highest being PM₁₀ quarterly emissions at 124 lbs/day).

Although hydrogen sulfide emissions do not require offsets, the applicant is proposing to ensure that the SSU6 Project does not result in a net increase in emissions of H₂S by reducing H₂S emissions at the existing Leathers or Elmore Geothermal Power Plants. The applicant has stated that they will ensure the creation of an emission reduction that will offset the SSU6 H₂S emission by a ratio of 1.2:1.0 (16.5 tons of ERCs). The applicant has not decided which plant they plan to control. Both plants have existing emissions in quantities sufficient to produce sufficient offsets assuming a Lo-Cat control efficiency of 99.5% and/or bioreactor control efficiency of 90% for non-condensable gas H₂S and condensate H₂S control, respectively. In the FSA, staff will provide detailed information and calculations regarding the H₂S offset source when the applicant has finalized its selection.

The applicant also proposes to offset PM₁₀ emissions from the SSU6 Project with offsets derived from the District’s approved list at a 1.2:1.0 ratio (16.5 tons of ERCs). There are no available banked stationary source PM₁₀ emission reduction credits; however, there are almost 300 tons of Agricultural Burn PM₁₀ ERCs available in the District’s bank inventory (District 2003). The applicant put out a Request for Proposal (RFP) to obtain the necessary PM₁₀ emission offsets and a total of 65 separate credit certificates from 18 separate farmer/farm corporation credit holders with a total value of 202.48 tons of PM₁₀ offsets responded. While this shows that the availability of credits substantially exceeds the proposed project needs, this does not provide an offsets mitigation package that can be fully reviewed. The applicant will have to determine the specific offsets to be used prior to the issuance of the Final Determination of Compliance (FDOC) and Final Staff Assessment.

Additionally, the value of the agricultural burn ERCs diminishes over time. After two years they lose 25% of their original value annually until they no longer have any value after six years. This means that new offsets will have to be procured annually to maintain the offset package.

Staff Proposed Mitigation

Staff believes that the proposed emission controls minimize the project’s potential H₂S and PM₁₀ emissions to the maximum extent feasible. As noted previously, staff will continue to research potential methods to control the project’s ammonia emissions.

The applicant is proposing to offset its normal operating PM₁₀ and H₂S emissions using a 1.2:1.0 offset ratio. Staff further notes that the applicant’s offset package, considering the offset ratio and considering that the District does not credit the NO_x and SO₂ emissions reduced through the cessation of agricultural burning, meets staff’s CEQA requirement for a minimum offset ratio of 1:1 PM₁₀ and regulated PM₁₀ precursor

emissions and ozone precursor emissions. Staff considers the proposed offset levels adequate for the normal operating emissions.

The applicant has not proposed any mitigation for the commissioning or temporary source emissions. The PM₁₀ and H₂S emissions from these sources are substantial. While the commissioning will occur as a one time event, the other temporary emissions are based on annual expected occurrences. Staff is recommending that the PM₁₀ and H₂S emissions from the onsite CEC jurisdictional temporary activities be offset using additional emission reduction credits. This includes the plant startup and tank venting emissions estimated to be a total of 3.1 tons/year of PM₁₀ and 0.9 tons/year of H₂S.

Additionally, staff is requesting design mitigation, in the form of higher exhaust stacks to lessen the short-term emission impacts that occur as a result of the commissioning and temporary emission activities. While this measure does not eliminate all of the significant impacts, it does lower the maximum modeled commissioning 1-hour H₂S impacts from 148 µg/m³ to 67 µg/m³.

The quality of the existing background data being used to assess potential H₂S impacts is suspect. Staff is requesting that the applicant, who is the main contributor of H₂S emissions in the project area, perform a one-year H₂S ambient monitoring study to provide more reliable background H₂S conditions at the project site and in Calipatria. This data could be used to determine if the control measures and staff's proposed mitigation measures will be effective, or if additional mitigation measures need to be employed if a source(s) is identified as causing an air quality problem.

Finally, due to the potential for nuisance conditions to occur during initial commissioning, staff is requesting that the applicant provide formal notification at least one week in advance of initiating commissioning to the Cities of Calipatria and Westmorland and to the Sonny Bono Wildlife Refuge. This measure is proposed to allow some warning, to those living within the nearby communities and visitors to the area, that the Sony Bono Wildlife Refuge or Obsidian Butte areas, along with other areas farther from the project site, may be impacted by nuisance odors during the initial commissioning period. This may help the community avoid some of the more obnoxious nuisance impacts that may occur during the commissioning period.

The limits and requirements of these mitigation measures are provided in Staff's recommended Conditions of Certification **AQ-C5 through AQ-C11**. The District's conditions need to be improved and augmented and will be provided as conditions of certification in the Final Staff Assessment. The proposed conditions from the District's Preliminary Review document are provided for reference in **Air Quality Appendix A**.

Staff is also proposing mitigation measures for well drilling and well flow testing operations that are outside of the CEC's licensing jurisdiction. We are proposing mitigation measures that the lead agencies responsible for permitting such activities can and should implement.

Adequacy of Proposed Mitigation

The applicant's proposed mitigation measures, plus staff's additional proposed mitigation measures and the District's anticipated proposed conditions are considered to

be adequate to mitigate the project impacts to less than significant for all activities and pollutants; except the project's initial commissioning phase, temporary well flow testing and well flow run activities, and the project's unmitigated ammonia emissions. Staff finds that there will be significant immitigable H₂S impacts from initial commissioning, periodic well flow testing and well flow run activities. Staff further finds that, if immitigable, the project's ammonia emissions will likely create significant secondary PM₁₀ impacts.

CUMULATIVE IMPACTS

The applicant, in consultation with Imperial County APCD, performed a preliminary review of the cumulative impacts associated with the SSU6 Project (SSU6 2002a, p. 5.1-44). The Salton Sea Mineral Recovery Facility, located approximately 0.75 miles southeast of the proposed SSU6 project, received construction permits and is currently in the startup phase for recovering zinc from brine (District 2003, page 18). The Mineral Recovery Facility emits Sulfuric Acid Mist (SAM), VOCs, and PM₁₀. The facility controls its PM₁₀ point source emissions with baghouses and has an emission limit total of 0.145 lb/hr of PM₁₀. Dispersion modeling conducted as part of the application for the Mineral Recovery Facility shows maximum project impacts of 0.95 µg/m³ (24-hour) and impacts of 0.18 µg/m³ (annual) (SSMR 1997). The applicant performed a modeling review to assess the combined PM₁₀ effects. The results of the modeling analysis are summarized in **AIR QUALITY Table 29**. The modeling was performed for each year (1995-1999) of the meteorological data set that was used in the modeling analysis. Therefore, there are five different sets of PM₁₀ modeling results shown on Table 29.

AIR QUALITY Table 29
SSU6 Project Cumulative Modeling Analysis Maximum Impacts, µg/m³

| Pollutant | Source | 1995 | 1996 | 1997 | 1998 | 1999 |
|-----------------------------|--|------|------|------|------|------|
| PM ₁₀ 24-hour | SSU6 Project ^a | 1.9 | 2.3 | 2.1 | 2.1 | 2.3 |
| | Mineral Recovery Facility ^b | 1.0 | 1.3 | 1.3 | 1.4 | 1.3 |
| | Combined ^a | 1.9 | 2.3 | 2.1 | 2.1 | 2.3 |
| PM ₁₀ Annual | SSU6 Project | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| | Mineral Recovery Facility ^b | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 |
| | Combined | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 |

Source: SSU6 2002a, Tables 5.1-93 and 5.1-94.

Note(s):

- a. These values were determined through a review of the modeling output files provided by the applicant, which conflict with the values presented in AFC Table 5.1-93.
- b. These values are believed to be slightly higher than the values presented in the original Mineral Recovery Facility permit applicant due to the different meteorological data used in the SSU6 cumulative modeling analysis.

As can be seen from the modeling results provided in **AIR QUALITY Table 29**, the results show that there is no significant additive impacts for the two facilities. The maximum 24-hour cumulative impacts were modeled to occur within 4/10ths of a mile from the center of the SSU6 project site, and the maximum annual impacts were modeled to occur within a mile of the center of the SSU6 project site.

The IID Water Conservation Transfer Project is currently in the permitting phase. This project has the potential to have an indirect air quality impact in the area. One potential

result of this project is a decrease in the Salton Sea water level and therefore an increase in the exposed shoreline area. This effect would increase the potential for windblown dust (PM₁₀ emissions). However, staff does not have any specific emission estimates or locations for the increase of windblown dust, nor any point source emissions or stack parameters to model; therefore this project has not been included in the cumulative impact modeling analysis. Staff will further investigate this project and the potential to model its expected emission impacts and will include it in the Final Staff Assessment cumulative impact modeling analysis, if warranted.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed Salton Sea Unit #6 power plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on the air quality analysis, staff identified unmitigated significant direct impacts resulting from the construction or operation of the project, and has proposed additional mitigation methods to reduce some of these impacts to insignificant levels. However, staff has not been able to determine appropriate mitigation measures to reduce all of the unmitigated short-term emission source impacts (commissioning and well flow testing emissions), as well as, the project's unmitigated ammonia emissions impacts to a level of insignificance.

The project's H₂S emissions, during commissioning and other temporary operations will have the potential to cause significant short-term impacts, not only in the unpopulated areas near the project site but in populated areas within the six-mile radius and outside of the six-mile radius, such as within the City of Calipatria. Staff's is suggesting a measure (**AQ-C6**) that should eliminate the significant impacts from plant startup and reduce the impacts during initial commissioning. However, the commissioning emissions, which are not readily controlled, still have the potential to cause exceedances of the 1-hour state ambient air quality standard and will have the potential to cause nuisance odors at a distance up to and past the City of Calipatria. Commissioning is a one time event that is scheduled to last a total of only 14 days. The secondary PM₁₀ impacts that are likely to result from the project's unmitigated ammonia emissions is considered a regional issue, which may not have a significant disproportionate impact on the local area. Staff will work with the applicant to obtain additional information regarding mitigation measures that may reduce or eliminate these significant impacts.

COMPLIANCE WITH LORS

FEDERAL

The District is responsible for issuing the New Source Review (NSR) permit for this project. Since the District has not yet issued an FDOC that provides a complete analysis of the project and provides federally enforceable permit conditions, staff cannot make a final recommendation as to whether the project would be in compliance with all NSR requirements. The project is not subject to PSD, Title IV, or Title V permits.

STATE

Staff believes that if and when the appropriate mitigation (offsets) are provided to demonstrate compliance with the District rules and demonstrate a minimum 1:1 emissions offset ratio for all non-attainment pollutants and their precursors, the project will at that time demonstrate substantial compliance with California State Health and Safety Code, Section 41700. Furthermore, with the additional staff recommended conditions for plant startup the project's construction and normal operating emissions should not cause significant exceedances of the state 1-hour H₂S AAQS. However, as noted previously the project's initial commissioning period and well flow testing operations have been found to have significant immitigable H₂S impacts and would not demonstrate compliance with Section 41700 of the California H&SC. Additionally, the project's ammonia emissions have the potential to cause significant secondary PM₁₀ emissions. Additional research of appropriate mitigation measures is needed before compliance with the California Health and Safety Code can be determined.

LOCAL

The Imperial County Air Pollution Control District has submitted a preliminary review of the SSU6 project (District 2003). However, this review did not provide a complete assessment of the project, did not address all project operating modes, and did not provide federally enforceable permit conditions. Staff will work with the District to remedy these shortfalls, and will address the compliance with local LORS in detail in the FSA after the District provides the FDOC.

FACILITY CLOSURE

SSU6 has a design life of 30 years, and may operate much longer than that. However, eventually the SSU6 will close, as a result of the end of its useful life; through some unexpected situation such as a natural disaster or catastrophic facility breakdown; or if the facility became economically noncompetitive, forcing decommissioning. When the facility closes, all sources of air emissions would cease and thus all impacts associated with those emissions would no longer occur.

During the operating life of the facility, temporary facility closure may be required and permanent facility closure would eventually be required. Temporary closure constitutes an unexpected shutdown for a period exceeding the time required for normal maintenance (e.g., for overhaul or replacement of combustion turbines). Cause for temporary closure might include a disruption in the supply of natural gas or damage to

the plant from an earthquake, fire, storm, or other event. Permanent closure constitutes a complete cessation in operations with no intent to restart operations, due to plant age, damage to the plant that is beyond repair, economic conditions, or other reasons.

The Permit to Operate, issued by the District, is required for operation of the facility and the applicant must pay permit fees annually while it maintains the Permit to Operate. If the applicant chooses to close the facility and not pay the permit fees, then the Permit to Operate would be cancelled. In that event, the project could not restart and operate unless the applicant pays the fees to renew the Permit to Operate.

When permanent closure occurs and if it were decided to dismantle the project's equipment and structures, there would likely be fugitive dust emissions associated with this dismantling effort. A Facility Closure Plan shall be submitted to the Energy Commission Compliance Project Manager and should include the specific details regarding how the applicant plans to demonstrate compliance with the District Rules (i.e. Rule 800 requirements) regarding fugitive dust emission mitigation.

A detailed description of the closure requirements are provided in the General Conditions Including Compliance Monitoring and Closure Plan section of the Staff Assessment.

CONCLUSIONS AND RECOMMENDATIONS

There are five areas of concern that need to be resolved prior to completing the FSA. Staff will work with the applicant, the air district, and the appropriate agencies to resolve each of these matters.

COMMISSIONING AND WELL FLOW TESTING EMISSIONS

The modeling analysis indicates that the unmitigated commissioning and well flow testing H₂S emissions have the potential to cause exceedances of the 1-hour H₂S CAAQS. Staff has determined that the initial commissioning period and well flow testing operations have the potential to cause significant unmitigated H₂S impacts. The commissioning period is expected to last two weeks, and the well flow testing operations will occur occasionally during construction and occasionally throughout the operating life of SSU6 (48 hours for each production well flow test and 18 hours for each injection well flow test). The impacts are best characterized as nuisance impacts. The maximum modeled impacts concentration for commissioning or well flow testing (0.066 ppm, including background) is orders of magnitude lower than the Occupational Health and Safety Administration (OSHA) worker ceiling limit of 10 ppm, or the National Institute for Occupational Safety and Health (NIOSH) Immediately Dangerous to Life or Health (IDLH) concentration of 300 ppm. However, these impact levels are much higher than the lower odor threshold for H₂S (0.0005 ppm) and the H₂S odors may be noticeable as far as Calipatria during initial commissioning and well flow testing. These odor impacts, depending on wind conditions, have the potential to be of greater nuisance in areas closer to the project site such as the Sonny Bono Wildlife Refuge. Therefore, the H₂S emissions during initial commissioning and well flow testing have the potential to cause "nuisance, or annoyance to any considerable number of persons or to the public" in violation of California State Health and Safety Code, Section 41700. Additional information is necessary to determine if there are any feasible measures to mitigate

these impacts to less than significant. In order for staff to complete its analysis the applicant will need to provide additional information regarding all potential control technologies or other mitigation measures that could be employed during initial commissioning and well flow testing.

UNMITIGATED AMMONIA EMISSIONS

The project's unmitigated ammonia emissions, over 2,700 tons per year, have the potential to cause significant secondary particulate formation. Staff believes that the project's ammonia emissions constitute a significant impact related to secondary PM₁₀ formation. The applicant has provided information on two potential mitigation measures to control the ammonia emissions, but other technologies may be technically feasible for use on the SSU6 project condensate streams. Staff has identified that other technologies, such as the Z-XM™ ammonia removal process licensed by Water Remediation Technologies, LLC, and reverse osmosis membrane technologies may be technically feasible. The applicant needs to provide additional information regarding the technical feasibility and cost of these technologies before staff can come to a final conclusion regarding the feasibility of ammonia emission controls for the SSU6 project.

OFFSET PACKAGE REQUIRED

The applicant has not yet provided a detailed offset package. While the applicant has shown that it has the ability to secure necessary PM₁₀ and H₂S offsets, they have not specified the offset package to be used. Before staff can recommend certification of the project the applicant must provide a list of the specific emission reduction credits that will be used to offset the project's PM₁₀ emissions, and must provide a detailed description of how the Elmore or Leathers plant emission reductions will be obtained to offset the project's H₂S emissions.

BIOFILTER OXIDIZER EFFICIENCY DOCUMENTATION

The applicant has not provided proof that the biofilter oxidizers will meet the assumed 95% H₂S control efficiency. The applicant has not completed the source tests that were going to demonstrate that the biofilter oxidizers are capable of meeting the proposed 95% H₂S control efficiency. The emission estimate and impact assessment are based on this control efficiency assumption. Therefore, the control efficiency of the biofilter oxidizer needs to be confirmed. If the control efficiency is lower than currently being assumed then a revised emissions estimate and impacts analysis will need to be completed.

A COMPLETE FDOC WITH ENFORCEABLE CONDITIONS

The PDOC did not provide a complete assessment of project impacts and did not contain federally enforceable permit conditions. Staff will work with the District to remedy these shortfalls. It is expected that the PDOC conditions will change substantially when the District publishes the FDOC, and the revised conditions, when complete and federally enforceable, will be published within the Final Staff Assessment. The District's PDOC conditions are presented in **Air Quality Appendix A**.

Resolution of each of these issues and data gaps is necessary in order to come to a positive finding for the SSU6 project. Staff will work with the applicant and the District to

help find a resolution to each of these issues. When all of the above issues are resolved and the data obligations are met, staff would recommend the following staff Conditions of Certification to address the impacts associated with the construction and operation of the SSU6 Project. Staff reserves the right to recommend additional Conditions of Certification after receipt of the FDOC and other information gathered to resolve the identified significant impacts and data gaps.

CONDITIONS OF CERTIFICATION

STAFF CONDITIONS

AQ-C1 The project owner shall fund all expenses for an on-site air quality construction mitigation manager (AQCMM) who shall be responsible for maintaining compliance with conditions AQ-C2 through AQ-C5 for the entire project site and linear facility construction. The on-site AQCMM shall have full access to areas of construction of the project site and linear facilities, and shall have the authority to appeal to the CPM to have the CPM stop any or all construction activities as warranted by applicable construction mitigation conditions. The on-site AQCMM shall have a current certification by the California Air Resources Board for Visible Emission Evaluation prior to the commencement of ground disturbance. The on-site AQCMM shall not be terminated without written consent of CPM.

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the CPM, for approval, the name, current ARB Visible Emission Evaluation certificate, and contact information for the on-site AQCMM.

AQ-C2 The project owner shall provide a construction mitigation plan (CMP), for approval, which shows the steps that will be taken, and reporting requirements, to ensure compliance with conditions AQ-C3 through AQ-C5.

Verification: At least 60 days prior to start any ground disturbance, the project owner shall submit to the CPM, for approval, the construction mitigation plan. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. Otherwise, the plan shall be deemed approved.

AQ-C3 The on-site AQCMM shall submit to the CPM, in the monthly compliance report (MCR), a construction mitigation report that demonstrates compliance with the following mitigation measures:

- a) All unpaved roads and disturbed areas in the project and linear construction sites shall be watered until sufficiently wet. The frequency of watering can be reduced or eliminated during periods of precipitation.
- b) The main access and egress routes to and from the SSU6 main construction site for construction employees and delivery trucks shall be paved prior to the initiation of construction. All internal power plant roads shall be paved as early as possible. Construction employees and delivery drivers shall use paved roads to access and leave the main construction site.

- c) No vehicle shall exceed 10 miles per hour within the construction site.
- d) The construction site entrances shall be posted with visible speed limit signs.
- e) All vehicle tires shall be washed or cleaned free of dirt prior to entering paved roadways.
- f) Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.
- g) All entrances to the construction site shall be treated with dust soil stabilization compounds.
- h) No construction vehicles can enter the construction site unless through the treated entrance roadways.
- i) Construction areas adjacent to any paved roadway shall be provided with sandbags to prevent run-off to the roadway.
- j) All paved roads within the construction site shall be swept twice daily.
- k) At least the first 500 feet of any public roadway exiting from the construction site shall be swept twice daily.
- l) All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or be treated with appropriate dust suppressant compounds.
- m) All vehicles that are used to transport solid bulk material and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.
- n) All construction areas that may be disturbed shall be equipped with windbreaks at the windward sides prior to any ground disturbance. The windbreaks shall remain in place until the soil is stabilized or permanently covered with vegetation.
- o) Any construction activities that can cause fugitive dust in excess of the visible emission limits specified in Condition **AQ-C4** shall cease when the wind exceeds 25 miles per hour.
- p) All diesel-fueled engines used in the construction of the facility shall be fueled only with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.
- q) All large construction diesel engines, which have a rating of 100 hp or more, shall meet, at a minimum, the 1996 ARB or EPA certified standards for off-road equipment.
- r) All large construction diesel engines, which have a rating of 100 hp or more, shall be equipped with catalyzed diesel particulate filters (soot filters), unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types.
- s) All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM that shows the engine meets the conditions AQ-C3(q) and AQ-C3(r) above.

- t) The construction mitigation measures shall include necessary fugitive dust control methods required to maintain compliance with District Rule 800. Where the requirements of Rule 800 and this condition are in conflict the more stringent requirement shall apply.

Observations of visual dust plumes would indicate that the existing mitigation measures are not resulting in effective mitigation. The CMM shall implement the following procedures for additional mitigation measures if the CMM determines that the existing mitigation measures are not resulting in effective mitigation:

- a) The CMM shall direct more aggressive application of the existing mitigation methods within 15 minutes of making such a determination.
- b) The CMM shall direct implementation of additional methods of dust suppression if step a) specified above, fails to result in adequate mitigation within 30 minutes of the original determination.
- c) The CMM shall direct a temporary shutdown of the source of the emissions if step b) specified above fails to result in adequate mitigation within one hour of the original determination. The activity shall not restart until one full hour after the shutdown. The owner/operator may appeal to the CPM any directive from the CMM to shutdown a source, provided that the shutdown shall go into effect within one hour of the original determination unless overruled by the CPM before that time.

Verification: In the MCR, the project owner shall provide the CPM a copy of the construction mitigation report and any diesel fuel purchase records, which clearly demonstrates compliance with condition **AQ-C3**.

AQ-C4 No construction activities are allowed to cause visible emissions at or beyond the project site fenced property boundary. No construction activities are allowed to cause visible plumes that exceed 20 percent opacity at any location on the construction site. No construction activities are allowed to cause any visible plume in excess of 200 feet beyond the centerline of the construction of linear facilities, or cause visible plumes to occur within 100 feet upwind of any occupied structures.

Verification: The on-site AQCM shall conduct a visible emission evaluation at the construction site fence line, or 200 feet from the center of construction activities at the linear facility, or adjacent to occupied structures, each time he/she sees excessive fugitive dust from the construction or linear facility site. The records of the visible emission evaluations shall be maintained at the construction site and shall be provided to the CPM on the monthly construction report.

AQ-C5 The project owner shall submit to the CPM for review and approval any modification proposed by either the project owner or issuing agency to any project air permit.

Verification: The project owner shall submit any proposed air permit modification to the CPM within five working days of its submittal either by 1) the project owner to an

agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-C6 The stacks for all high pressure steam vent exhausts, and any other single exhaust stack with an expected maximum H₂S and/or PM₁₀ emission rate over 10 lbs/hour, shall be at least 80 feet in height during commissioning activities and during plant startup. The use of temporary stacks that meet this requirement is acceptable.

Verification: The project owner shall submit revised stack parameter data and revised modeling analyses for PM₁₀ and H₂S impacts for commissioning and plant startup activities at least six months prior to initial commissioning.

AQ-C7 The project owner shall, in collaboration with the California Air Resources Board and the Imperial County Air Pollution Control District, perform an H₂S ambient monitoring study. The H₂S ambient monitoring study shall be conducted continuously for a period of 1-year. This ambient monitoring study shall, at a minimum, monitor average hourly H₂S concentrations in the area of the project site and in the town of Calipatria; and simultaneously collect hourly wind speed and wind direction data at each monitoring location. The ambient monitoring study shall be completed prior to the first well flow test associated with the SSU6 project.

Verification: The project owner shall submit to the CPM an H₂S ambient monitoring study plan at least 30 prior to initiating the study. The project owner shall submit a summary of the ambient monitoring results to the CPM monthly no later than 30 days following the end of each month until the completion of the ambient monitoring study. The project owner shall submit to the CPM the complete annual monitoring results within 30 days of the completion of the ambient monitoring study.

AQ-C8 The project owner shall submit to the CPM and APCO Quarterly Compliance Reports, no later than 30 days following the end of each calendar quarter, that include operational and emissions information as necessary to demonstrate compliance with all operating Conditions of Certification. The Quarterly Operational Report will specifically note or highlight incidences of noncompliance.

Verification: The project owner shall submit the Quarterly Operational Reports to the CPM and APCO no later than 30 days following the end of each calendar quarter.

AQ-C9 All diesel-fueled engines used in the operation and maintenance of the facility shall be fueled only with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.

Verification: The project owner shall maintain for inspection fuel purchase, or other, records indicating the fuel sulfur content of the diesel fuel being used at the site.

AQ-C10 The project owner shall provide emission reduction credits at a 1:1 ratio to offset the estimated annual onsite temporary activity PM₁₀ and H₂S emissions in

the quantity of 3.1 and 0.9 tons, respectively. This is in addition to the 16.5 tons of offsets required for PM₁₀ and H₂S by the District.

Verification: The project owner shall provide records of the required offsets being surrendered to the CPM prior to project commissioning.

AQ-C11 The project owner shall maintain 19.6 tons of emission reduction credits committed to the SSU6 project to offset the projects PM10 emissions. Further, the project owner shall commit specific emission reduction credits, as provided in Table AQ-C11, as the offset package for the SSU6 project, and shall maintain 19.6 tons of ERCs, accounting for credit depreciation, for the life of the project.

Table AQ-C11 – SSU6 Project Committed PM₁₀ ERCs

| ERC Certificate Number | Value (tons) |
|------------------------|------------------|
| To be determined | To be determined |
| To be determined | To be determined |
| Total Value | 19.6 |

(Please note: the applicant will need to provide ERC certificate number and value data to complete this table prior to publishing the FDOC and FSA)

The project owner shall not use any of the ERCs identified in Table AQ-C11 for purposes other than offsetting the SSU6 project.

Verification: At least 60 days prior to project commissioning, the project owner shall surrender the identified ERCs and in the amounts shown in Table AQ-C11 to the District and provide documentation of that surrender to the CPM. The project owner shall update this table each time an ERC certificate depreciates and shall provide the revised table to the CPM within 15 days of the certificate depreciation.

AQ-C12 The project owner shall provide a written notification to the Cities of Calipatria and Westmorland and to the Sony Bono Wildlife Refuge indicating when initial commissioning activities will start. This letter shall plainly state the expected duration of the initial commissioning and shall note that nuisance odors may occur during the initial commissioning period. This letter shall be provided at least two week prior to initiating initial commissioning.

Verification: The project owner shall provide a copy of this letter to the CPM at least one week prior to initiating initial commissioning.

STAFF RECOMMENDATIONS FOR OTHER AGENCIES WITH JURISDICTION OVER WELL DRILLING/WELL FLOW ACTIVITIES

The following conditions can and should be implemented by the appropriate responsible agencies approving the geothermal resource wells, pads and associated pipelines:

1. The well flow testing shall be completed as expeditiously as possible.
2. The well flow testing stacks, in situations where plume downwash may occur, shall be a minimum of 80 feet tall in order to ensure maximum dispersion of the well flow exhaust emissions.

3. Well drilling activities shall use engines that meet or exceed 1996 off-road engine emission standards, and where appropriate the use of catalyzed diesel particulate filters shall be required.
4. Well drilling diesel engines shall be required to use ultra-low (15 ppm) sulfur diesel fuel.

REFERENCES

CARB (California Air Resources Board) 1999: Guidance for Power Plant Siting and Best Available Control Technology. Issued September 1999.

CARB (California Air Resources Board) 2000: California Ambient Air Quality Data CD ROM.

CARB (California Air Resources Board) 2002: California Ambient Air Quality Data available on CARB Website. <http://www.arb.ca.gov/adam/>.

Imperial County Air Pollution Control District (District) 2003: Preliminary Review Salton Sea Unit 6. January 23, 2003.

CEOE (CE Obsidian Energy, LLC, Calipatria, California) 2002a: Application for Certification for Salton Sea Unit 6, Geothermal Power Plant Project Volume I & II. July 26, 2002.

CEOE (CE Obsidian Energy, LLC, Calipatria, California) 2002b: Data Request Response Set 1. Submitted to the California Energy Commission on December 2, 2002.

CEOE (CE Obsidian Energy, LLC, Calipatria, California) 2002c: Data Request Response Set 2. Submitted to the California Energy Commission on December 16, 2002.

CEOE (CE Obsidian Energy, LLC, Calipatria, California) 2003a: Data Request Response Set 3. Submitted to the California Energy Commission on February 5, 2003.

SSMR (Salton Sea Mineral Recovery) 1997: Salton Sea Mineral Recovery Project Application for Authority to Construct Permit for CalEnergy Minerals, Inc., Calipatria, California, by RTP Environmental Associates, Inc. December 1997.

South Coast Air Quality Management District (SCAQMD) 1993: CEQA Air Quality Handbook. November, 1993 Update.

Air Quality Appendix A

Imperial County Air Pollution Control District Preliminary Review Conditions

Condition 1

The Permittee shall control fugitive dust that may be emitted during the construction, the handling or hauling of any product, or from traveled roads.

Condition 2

The Permittee shall notify the Air Pollution Control District (APCD) prior to Unit 6 cold startup. The notification shall consist of the time and expected duration of the uncontrolled venting.

Condition 3

All emissions controls systems shall be maintained in good working order and operating at their maximum control efficiency level specified in accordance to the application for this permit operating instructions. The Permittee shall keep a sufficient supply of catalyst, reagents and carbon for immediate system replenishments.

Condition 4

The following facilities emissions sources (exhausts) shall not exceed the following emission rates in Table 1.

Table 1

| Source (Controls) | Condenser Offgas (LO-CAT System or equivalent) control device | Condenser Offgas (Carbon Absorption or equivalent) control device | Dilution Heaters (2 units) (No controls) | Cooling Towers (2 units) (Bio-Oxidizers 2 cells) |
|---|--|---|--|--|
| Pollutant(s) | Emission Limit | Emission Limit | Emission Limit | Emission Limit |
| Hydrogen Sulfide H ₂ S | 0.80 lb/hr/24 hrs | N/A | 0.7 lb/hr/24 hrs | 1.7 lb/hr/24 hrs |
| Benzene | N/A | 0.2 lb/hr/24 hrs | N/A | N/A |
| All Non Benzene and Non Methane VOC's | N/A | <0.5 lb/day/24 hrs | <0.5 lb/day/24 hrs | <0.5 lb/day/24 hrs |
| Heavy Metals | N/A | N/A | <0.55 lb/day | N/A |

Condition 5

The Permittee shall install and maintain in good working order a continuous H₂S instack monitor and a flow gas meter at the H₂S control system exhaust. The instack monitor and flow gas meter shall meet all specification, calibration, accuracy and quality assurance checks as set forth by the manufacturer. The monitor shall be equipped with a data logger capable of recording the continuous flow gas (SCFM) and H₂S concentrations in PPMv and lbs/hr.

Condition 6

At least 30 days prior to the installation of emissions control equipment and monitors, the Permittee shall submit all the air emissions equipment specifications and receive prior approval from the Air Pollution Control District.

Condition 7

Upon any high pressure steam bypassing, the high pressure steam shall be exhausted into the turbine condenser. The NCG gases in the condenser shall continue to be exhausted into the air emission control systems.

Condition 8

Upon any bypassing of high, standard or low pressure steam to an uncontrolled steam vent, the Permittee shall notify the APCD by fax no later than 48 hours after occurrence of the time and quantity of steam vented in pounds per hour and duration of the venting or expected venting will occur.

Condition 9

The Permittee shall erect and or construct all air emission vents and stack heights in accordance to the heights used in the Air Emissions Modeling Impact application for Unit 6. Permittee will consult with the APCD regarding substantial modifications.

Condition 10

The Permittee shall provide safety, access, and facilities for source testing and inspections of any emission source upon the Air Pollution Control District request.

Condition 11

The Permittee shall submit quarterly, no later than 15 days after the end of each calendar quarter, a report of the time and date of the emissions containing the following:

1) Condenser Off gas Ejectors

LO-CAT exhaust maximum emissions and 24 hour hydrogen sulfide daily average emissions in ppmv and lbs/hr.

Carbon adsorption exhaust maximum benzene emissions in ppmv and lbs/hr average.

Carbon absorption exhaust maximum mercury emissions in lbs/hr.

2) Cooling Tower

Cooling tower hydrogen sulfide off gas emissions in lbs/hr and lbs/hr maximum, 24 hr average.

The Permittee shall describe the test and methodology for determining the cooling tower off gas emissions.

3) Dilution Heater

Dilution heater hydrogen sulfide emissions in lbs/hr.

4) Vents

The amount of controlled and uncontrolled venting of H₂S, benzene and emissions of other listed toxic gases in lbs/hr and duration of venting during the reporting quarter.

5) Steam Blows

The number of steam blows, duration and amount of steam in pounds.

Condition 12

The Permittee shall provide a performance source test no later than 6 months after commencing commercial operations, and no later than 48 months after the end of the commissioning period. A source test protocol shall be submitted and approved by the APCD no later than 60 days before testing. Testing shall be conducted for all of the following compounds:

| | |
|------------------|--------------------|
| Hydrogen sulfide | Xylene |
| Ammonia | Methane |
| Arsenic | Carbon dioxide |
| Benzene | Nitrogen compounds |
| Ethylbenzene | Oxygen |
| Mercury | Radon |
| Toluene | |

The power plant must be at no less than 80% of full power during testing.

Condition 13

The Permittee shall provide offsets at a ratio of a minimum 1.2 to 1. 16.6 tons (13.8 x 1.2) of offsets shall be provided for hydrogen sulfide and 18.4 tons (15.3 x 1.2) for PM₁₀. The offsets shall be acquired no later than the time when Unit 6 comes online.

BIOLOGICAL RESOURCES

Natasha Nelson

INTRODUCTION

This section provides the California Energy Commission's (Energy Commission) Preliminary Staff Assessment (PSA) of potential impacts to terrestrial and aquatic biological resources from the construction and operation of the Salton Sea Unit 6 Project (SSU6) proposed by CE Obsidian Energy, LLC (CEOE; applicant). Information provided in this document addresses potential impacts to state and federally listed species, species of special concern, and areas of critical biological concern. This analysis also describes the biological resources of the project site and at the locations of ancillary facilities. This document determines the need for mitigation, the adequacy of mitigation proposed by the applicant, and where necessary, specifies additional mitigation measures to reduce identified impacts to less than significant levels. It also determines compliance with applicable laws, ordinances, regulations and standards (LORS), and recommends conditions of certification.

This analysis is based, in part, upon information provided in the Application for Certification (AFC) for the Salton Sea Project (CEOE 2002a, Section 5.5 and Appendix K), data adequacy responses (CEOE 2002e), various responses to staff data requests (CEOE 2002l and 2003d) and CURE data request (CEOC 2003a), site visits conducted on August 21, 2002 and January 9, 2003, and discussions with various agency and applicant representatives during a Data Response and Issues Workshop on January 9, 2003.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The applicant will need to abide by the following laws, ordinances, regulations, and standards during project construction and operation.

FEDERAL

Clean Water Act of 1977

Title 33, United States Code, sections 1251-1376, and Code of Federal Regulations, part 30, section 330.5(a)(26), prohibit the discharge of dredged or fill material into the waters of the United States without a permit. The administering agency is the U.S. Army Corps of Engineers (USACE). The applicant has submitted an application for a Section 404 permit for its proposed impacts to wetlands along McKendry Road.

Endangered Species Act (ESA) of 1973

Title 16, United States Code, section 1531 *et seq.*, and Title 50, Code of Federal Regulations, part 17.1 *et seq.*, designate and provide for protection of threatened and endangered plant and animal species, and their critical habitat. The administering agency is the U.S. Fish and Wildlife Service (USFWS). The USACE and Bureau of Land Management (BLM) are requesting consultation pursuant to Section 7 of the ESA for the proposed project.

Migratory Bird Treaty Act

Title 16, United States Code, sections 703 through 712, prohibit the take of migratory birds, including nests with viable eggs. The administering agency is the USFWS. The applicant would need to request a permit for the take of nest(s) during construction.

California Desert Conservation Area Plan

The California Desert Conservation Area Plan (CDCA) encompasses 25 million acres of land in Southern California that was designated by Congress in 1976 through the Federal Land Policy Management Act. The BLM directly administers about 10 million acres of the CDCA. The 1980 CDCA Plan, as amended, is based on the concepts of sustained yield, multiple-use, and maintenance of environmental quality. The CDCA, among other tasks, designated utility corridors; any utilities outside of these corridors require an amendment to the CDCA. The applicant is working with the BLM to prepare an amendment package.

Management and General Public Use of the National Wildlife Refuge System

Executive Order 12996 of March 25, 1996 stated the mission of the National Wildlife Refuge is to preserve a national network of lands and waters for the conservation and management of fish, wildlife, and plant resources of the United States for the benefit of present and future generations. The Order set forth guiding principles for public access and involvement, habitat preservation, and local partnerships.

National Wildlife Refuge System Improvement Act of 1997

The Act's main components improve the National Wildlife Refuge System Administration Act of 1966 by amending it to include a unifying mission for the Refuge System, a new process for determining compatible uses of refuges, and a requirement for preparing comprehensive conservation plans. The legislation requires that a comprehensive conservation plan (also known as comprehensive management plan) be in place for each national wildlife refuge within 15 years after passage of this bill. The plans must be revised at least every 15 years. Guidelines on producing a comprehensive conservation plan were published in the Federal Register on May 25, 2000. Salton Sea does not have a comprehensive conservation plan completed.

Salton Sea Reclamation Act of 1998

The Salton Sea Reclamation Act of 1998 (Public Law 105-372; Sonny Bono Memorial Salton Sea Reclamation Act) directs the Secretary of Interior to "complete all studies of various options that permit the continual use of the Salton Sea as a reservoir for irrigation drainage and:

- reduce and stabilize the overall salinity of the Salton Sea;
- stabilize the surface elevation of the Salton Sea;
- reclaim, in the long term, healthy fish and wildlife resources and their habitats; and
- enhance the potential for recreational uses and economic developments of the Salton Sea."

Lea Act

The Lea Act was enacted to help farmers who were experiencing problems with crop damage from ducks and geese. This Act enacted on May 18, 1948 (16 U.S.C. 695-695c; 62 Stat. 238) authorized the Secretary of Interior to acquire and develop waterfowl and other wildlife management areas in California, provided the State acquires equivalent acreage. Lands acquired under the Act as management areas are not subject to the prohibition against taking birds, nests, or eggs, and hunting may be regulated in a cooperative manner necessary to carry out the provisions of the Act and subject to the provisions of the Migratory Bird Treaty Act. The Salton Sea Wildlife Refuge currently rents land from Imperial Irrigation District (IID) in partial fulfillment of this Act.

STATE

With exception of the last LOR in this part of the PSA, the administering agency is the California Department of Fish and Game.

California Endangered Species Act (CESA) of 1984

Fish and Game Code sections 2050 through 2098 protect California's rare, threatened, and endangered species. The applicant would need to request review of the USFWS permits for conformance with CESA.

California Code of Regulations

California Code of Regulations Title 14, Division 1, Subdivision 3, Chapter 3, sections 670.2 and 670.5 list plants and animals of California that are designated as rare, threatened or endangered.

California Public Resources Code

Division 15, Chapter 6, Sections 25527, the code which guides the Energy Commission, prohibits placing facilities within ecological preserves, wildlife refuges, estuaries, and unique or irreplaceable wildlife habitats of scientific or educational value.

Fully Protected Species

Fish and Game Code sections 3511, 4700, 5050, and 5515 prohibit take of animals that are classified as fully protected in California.

Nest or Eggs – Take, Possess, or Destroy

Fish and Game Code section 3503 protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically protects California's birds of prey and their eggs by making it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

Migratory Birds – Take or Possession

Fish and Game Code section 3513 protects California's migratory birds by making it unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act or any part of such migratory non-game bird.

Significant Natural Areas

Fish and Game Code section 1930 *et seq.* designates certain areas such as refuges, natural sloughs, riparian areas and vernal pools as significant wildlife habitat.

Wildlife and Natural Areas

Fish and Game Code section 2700 *et seq.* provide funding to the Wildlife Conservation Board and CDFG for acquisition, enhancement, restoration, and protection of areas that are most in need of proper conservation. In the southern Salton Sea area, CDFG operates Imperial Wildlife Area in three units: Wister, Hazard, and Finney-Ramer.

Ecological Reserves

Fish and Game Code section 1580 *et seq.* establish ecological reserves that shall be preserved in a natural condition for the general public to observe native flora and fauna. It is unlawful to take a bird, mammal, or plant from an ecological reserve. San Felipe Creek Ecological Reserve, one such reserve, is located near the intersection of State Highways 86 and 78, about 10 miles west of the project.

Native Plant Protection Act of 1977

Fish and Game Code section 1900 *et seq.* designate state rare, threatened, and endangered plants.

Streambed Alteration Agreement

Fish and Game Code section 1603 *et seq.* regulates activities by private utilities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. The applicant would need a CDFG permit for its proposed impacts to wetlands along McKendry Road.

Regional Water Quality Control Board

By federal law every applicant for a federal permit or license for an activity which may result in a discharge into a water body must request state certification that the proposed activity will not violate state and federal water quality standards. The project owner would be required to get a CWA section 401 certification from the Colorado River Basin Regional Water Quality Control Board (RWQCB). The RWQCB provides its certification after reviewing the federal permits provided by the USACE.

LOCAL

Imperial County General Plan: Conservation and Open Space Element

The purpose of the Conservation and Open Space Element is to promote the protection, maintenance, and use of the County's natural resources with particular emphasis on scarce resources, and to prevent wasteful exploitation, destruction, and neglect of the

State's natural resources. The Conservation and Open Space element contains specific Biological Resource objectives¹ including:

- Objective 2.1: Conserve wetlands, fresh water marshes, and riparian vegetation.
- Objective 2.2: Protect significant fish, wildlife, plants species, and their habitats.
- Objective 2.3: Protect unique, rare, and endangered plants and animals and their habitat.
- Objective 2.4: Use the environmental impact report process to identify, conserve and enhance unique vegetation and wildlife resources.
- Objective 2.6: Attempt to identify, reduce and eliminate all forms of pollution, which adversely impact vegetation and wildlife.
- Objective 2.8: Adopt noise standards, which protect sensitive noise receptors from adverse impacts.

The primary mechanism to implement the Goals and Objectives of the Conservation and Open Space Element is to incorporate environmental concerns into land use planning. Thus, this Element also incorporates policies, and then identifies the programs the County intends to undertake to promote that policy. Under the heading of Biological Resource Conservation the County defines several relevant land planning policies.

Policy 1

Provide a framework for the preservation and enhancement of natural and created open space, which provides wildlife habitat values.

Protect riparian habitat and other types of wetlands from loss or modification by dedicating open space easements with adequate buffer zones, and by other means to avoid impacts from adjacent land uses. Road crossings or other disturbances of riparian habitat should be minimized and only allowed when alternatives have been considered and determined infeasible.

Policy 2

Landscaping should be required in all developments to prevent erosion on graded sites and, if the area is contiguous with undisturbed wildlife habitat, the plan should include revegetation with native plant species.

Imperial County General Plan: Noise Element

The purpose of the noise element is to make land use planning decisions, which protect the environment from excessive noise sources. The policy of the Noise Element is that construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB L_{eq}^2 , when averaged over an eight (8) hour period, and

¹ Objectives 2.5 and 2.7 are not applicable

² L The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.

measured at the nearest sensitive receptor. This standard assumes a construction period, relative to an individual sensitive receptor of days or weeks. In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB L_{eq} when averaged over a one (1) hour period. The Noise Element identifies that many riparian bird species are sensitive to excessive noise, and as such they are considered a sensitive receptor. During operations, the project would be held to the property line standard³. The property line standard allows from 50 dB to 75 DB to be generated from the project depending on the adjacent land use (see the NOISE section of this PSA).

The Noise Element includes a few applicable objectives relating to the issues staff identified related to biological resources:

- Objective 1.5 Identify sensitive receptors with noise environments which are less than acceptable, and evaluate measures to improve the noise environment.
- Objective 1.6 Collect data for existing noise sources in the County in order to improve the data base and enhance the ability to evaluate proposed projects and land uses.
- Objective 2.3 Work with project proponents to utilize site planning, architectural design, construction, and noise barriers to reduce noise impacts as projects are proposed.

Imperial County General Plan: Geothermal/Transmission Element

The Geothermal and Transmission Element of the General Plan presents the Goals and Objectives relative to geothermal development within the unincorporated areas of the County. The Geothermal/Transmission Element identifies that any transmission line exporting power from Imperial County may impact agricultural lands, wildlife, and the natural desert landscape. The planning and design of these lines should take into account these factors. The Geothermal and Transmission element contains specific Biological Resource objectives including:

- Objective 2.1 Site and design [geothermal] production facilities to lessen impacts on agricultural land and biological resources.
- Objective 2.3 Utilize existing easements or rights-of-way and follow field boundaries for liquid transmission lines.
- Objective 2.5 Consider relocating or creating new habitat as might be appropriate.
- Objective 5.2 Design [transmission] lines for minimum impacts on agriculture, wildlife, urban areas, and recreational activities.

³ The property line standard implies the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. The property line standards do not apply to construction noise.

SETTING

REGIONAL

The proposed project site and linear facility routes would be located at the southern end of the Salton Sea in Imperial County. The Salton Sea covers over 380 square miles, and thousands of waterfowl and other birds spend the winter in its waters or along the shoreline. The Salton Sea provides feeding, resting, and nesting habitat for birds and supports a diversity of wildlife species throughout the year.

The dry desert east and south of the Salton Sea has been converted to a highly productive agricultural area with an intricate system of dikes, pump stations, drains, and irrigation canals. Many parcels of land are isolated between the taller water conveyance features. Much of the agricultural production is alfalfa or food crops for retail sale during the winter months. Areas to the west and north of the Salton Sea are less developed.

The Chocolate Mountains stand just over 2,000 feet high on the east and northeast side of the valley, and the Santa Rosa Mountains stand over 4,500 feet high on the west and northwest. Because much of the valley area is below sea level, the mountains have isolated this part of the desert and created what is known as the Salton Sink. All rain that falls on the interior slopes of the trough or water used as irrigation, is isolated and flows into the lowest point in the trough, the Salton Sea (currently about 227 feet below sea level). This has created a large salinity problem because no salts or chemicals can be flushed out of the system. Currently the level of dissolved salt in the Salton Sea is around 40,000 parts per million. As a comparison, the Pacific Ocean is around 35,000 parts per million.

The southeast edge of the Salton Sink is gently sloping, and has a 40-mile-long dune system on the west side of Sand Hills. This is one of the largest in the United States and was formed by windblown beach sands of ancient Lake Cahuilla. Some crests reach heights of over 300 feet. These dunes are a large recreational attraction, but the northern portion has been designated a wilderness area by the BLM and is off limits to vehicles. The southwest edge of Salton Sink is a gently sloping desert environment with little topographical relief, with the exception of the Superstition Hills and Fish Creek Mountains which stand from 200 to 270 feet above sea level. These flatter areas are criss-crossed with highways, transmission lines, and other linear facilities which connect the United States and Mexico.

Existing Vegetation and Wildlife

The applicant completed a survey of flora and fauna in the project area. The observed plant species consisted primarily of a mixture of native and non-native herbaceous species commonly found in disturbed areas, fallow fields, meadows and wetlands. West of State Highway 86 are some relatively undisturbed lands under the jurisdiction of the BLM. The habitat west of State Highway 86 is creosote bush scrub consisting of creosote bush (*Larrea tridentata*), bittlenbush (*Ambrosia dumosa*), saltbush (*Atriplex* spp.), and ephedra (*Ephedra viridis*).

The Wildlife Refuge actively manages agricultural lands, wetlands, and upland habitat to supply foraging and nesting opportunities to the many birds that migrate to the Salton Sea. However, the majority of the land surface in the project area is subject to regular disturbance from agricultural activity. On the agricultural lands there is little or no cover or suitable nesting habitat above one foot from the surface; however there is foraging habitat. There are currently several geothermal facilities in the region similar to the proposed project.

An extensive survey of birds was undertaken to quantify the bird migration routes to the Salton Sea. The surveys found a diverse array of shorebirds, raptors, and waterfowl (see CEOE 2002a, Appendix K, Flyover and Abundance Survey Results). Birds arrive from distant southern locations crossing into the refuge which lies to the north of the project site. Some species were found in groups, like red-winged blackbirds (*Agelaius phoeniceus*), and others as individuals, like cattle egret (*Bubulcus ibis*). Stations near the New River and Alamo River showed high levels of flyover use, while others, like the proposed power plant site, showed little avian flyover use.

The Salton Sea was stocked with several marine fish in the 1950's when the salinity of the Salton Sea was nearly that of the Pacific Ocean. The introductions resulted in the establishment of orange-mouth corvina (*Cynoscion xanthulus*), sargo (*Anisotremus davidsoni*), and gulf croaker (*Bairdiella icistius*). Continued increases in salinity are threatening the fisheries in the Salton Sea. Fresh water game fish (e.g., striped bass [*Morone saxatilis*], black crappie [*Pomoxis nigromaculatus*]) were introduced to the canals of the irrigation system in the 1950's to remove weeds in the canals (Imperial County 1977). Tilapia (*Tilapia* ssp.), and introduced species from Africa, are also present in the canals. Increased salinity in the canals would also be deleterious to these species.

Special Status Species

Although the area around the project site has been highly modified, several special status plant and animal species are known to historically occur within one mile of the project area or along the project's linear facilities, or were specifically identified in USFWS and CDFG correspondence as likely to occur within the project area. The Salton Sea, just north of the project, supports over five endangered species at the Wildlife Refuge. A list of these species is presented in **Biological Resources Table 1**.

Peirson's Milkvetch (*Astragalus magdaleneae* var. *peirsonii*). Peirson's milkvetch is found in the slopes and hollows of mobile sand dunes, usually in the lee of the prevailing winds. The closest recorded occurrence of Peirson's milkvetch is Kane Spring, which is on the west side of the Salton Sea. Suitable habitat is lacking in the immediate area of the project. No further analysis of this plant is warranted as it is not expected to occur in the project vicinity.

Desert Pupfish (*Cyprinodon macularius*). The Desert pupfish was listed as a California endangered species in 1980; the USFWS listed this species as endangered and designated critical habitat in 1986 because of habitat alteration, the introduction of exotic species and contaminants, and other habitat impacts. The species was once endemic to the Colorado River and numerous springs throughout the Salton Sink, but is presently found only in the Salton Sea and some of its tributaries. Researchers have

been surveying for this species intensively since 1980 and found they are using several of the laterals, agricultural drains, and shoreline pools (CEOE 20021, Data Response BR-16; Black 1980). Surveys in the 1990s did not consistently detect Desert pupfish in the Salton Sea area (CEOE 2002a, Appendix K, Biological Assessment, Table 4).

Pelicans (*Pelecanus* spp.). The federally and state-listed endangered brown pelican (*Pelecanus occidentalis*) regularly occurs in the Salton Sea. The migrants usually begin to arrive in June and depart by late fall. Most do not nest in the area, although a few pairs formed in 1996 through 1999, and nests were established on Obsidian Butte, Mullet Island, and at the mouth of the Alamo River (Charles Pelizza, personal communication). American white pelicans (*Pelecanus eryrorhynchos*), a state species of special concern, uses the area as a migratory stop over in spring and fall, and some individuals may spend the winter. Both species use the open water portion of the sea for resting and feeding. Tens of thousands of pelicans use Mullet Island (about 4 miles north of Obsidian Butte). A brown pelican loafing area is located along the islands south and west of Obsidian Butte (Obsidian Butte Rookery; January 9, 2003 Data Reponse and Issues Meeting).

Since 1996, there have been several outbreaks of avian botulism at the Salton Sea. The most affected birds in this botulism outbreak, which normally targets waterfowl, were American white pelicans and brown pelicans. Mortality from these outbreaks is high, for example in 1996 over 8,000 American white pelicans and over 1,000 Brown pelicans were killed. Disease outbreaks are a chronic problem that is hard to remedy.

BIOLOGICAL RESOURCES - Table 1
Sensitive Species Known to Occur in the Project Vicinity
(CE Obsidean Energy 2002a, Table 5.5-1B and 5.5-1C)

| Sensitive Plants | Status* (Federal, State) |
|---|-------------------------------------|
| <i>Astragalus magdalenae</i> var. <i>peirsonii</i> (Peirson's milk-vetch) | FT, -- |
| Sensitive Wildlife | (Federal, State) |
| Birds | |
| <i>Pelecanus erythrohynchus</i> (American white pelican) | --, CSC |
| <i>Pelecanus occidentalis</i> (brown pelican) | FE, CE, CFP |
| <i>Phalacrocorax auritus</i> (double-crested cormorant) | --, CSC |
| <i>Ixobrychus exilis</i> (least bittern) | --, CSC |
| <i>Plagadis chichi</i> (white-face ibis) | --, CSC |
| <i>Accipiter cooperi</i> (Cooper's hawk) | --, CSC |
| <i>Accipiter striatus</i> (sharp-shinned hawk) | --, CSC |
| <i>Falco mexicanus</i> (prairie falcon) | --, CSC |
| <i>Circus cyaneus</i> (Northern harrier) | --, CSC |
| <i>Buteo regalis</i> (ferruginous hawk) | --, CSC |
| <i>Falco columbarius</i> (merlin) | --, CSC |
| <i>Pandion haliaetus</i> (osprey) | --, CSC |
| <i>Rallus longirostris yumanensis</i> (Yuma clapper rail) | FE, CT, CFP |
| <i>Lateralus jamaicensis coturniculus</i> (California black rail) | --, CT, CFP |
| <i>Charadrius montanus</i> (mountain plover) | FPT, CSC |
| <i>Numenius americanus</i> (long-billed curlew) | --, CSC |
| <i>Chidonias niger</i> (black tern) | --, CSC |
| <i>Larus californicus</i> (California gull) | --, CSC |
| <i>Larus atricilla</i> (Laughing gull) | --, CSC |
| <i>Runchops niger</i> (black skimmer) | --, CSC |
| <i>Sterna caspia</i> (Caspian tern) | --, CSC |
| <i>Sterna elegans</i> (Elegant tern) | --, CSC |
| <i>Sterna nilotica</i> (Van Rossem's gull-billed tern) | --, CSC |
| <i>Athene cunicularia</i> (burrowing owl) | --, CSC |
| <i>Empidonax traillii extimus</i> (southwestern willow flycatcher) | FE, -- |
| <i>Vireo bellii pusillus</i> (least Bell's vireo) | FE, CE |
| <i>Lanius ludovicianus</i> (loggerhead shrike) | --, CSC |
| <i>Dendroica petechia</i> (yellow warbler) | --, CSC |
| <i>Icteria virens</i> (yellow-breasted chat) | --, CSC |
| <i>Toxostoma lecontei</i> (LeConte's thrasher) | --, CSC |
| Fish | |
| <i>Cyprinodon macularius</i> (Desert pupfish) | FE, CE |
| Reptiles and Amphibians | |
| <i>Phrynosoma macallii</i> (Flat-tailed horned lizard) | --, CSC |
| Mammals | |
| <i>Eumops perotis californicus</i> (California mastiff bat) | --, CSC |
| <i>Macrotus californicus</i> (California leaf-nosed bat) | --, CSC |
| <i>Plecotus townsendii</i> (Townsend's big-eared Bat) | --, CSC |

* - **Status Legend:** FE: Federally Endangered; FT: Federally Threatened; FSC: Federal Species of Concern; FPE: Federal Proposed Endangered; FPT: Federal Proposed Threatened; FC: Federal Candidate for Listing; CE: California Endangered; CT: California Threatened; CPE: California Proposed Endangered; CSC: California Species of Special Concern; CFP: California Fully-protected Species; CR: California Rare; California Native Plant Society (CNPS) **CNPS List 1A:** Presumed Extinct; **CNPS List 1B:** Rare or endangered in California and elsewhere.

There are approximately 15 fish farming operations (or aquaculture) around Salton Sea (Rafferty 2003). Brown pelicans have been attracted to aquaculture farms in the area, and rapid flights from these ponds have resulted in deaths due to collisions with transmission lines (CDFG, personal communication to N. Nelson). Brown pelicans are also documented in USFWS records as striking distribution lines near the Salton Sea. There is no evidence of the birds striking transmission lines, which are much taller and have a thicker gauge wire.

Yuma Clapper Rail (*Rallus longirostris yumanensis*) On March 11, 1967, the Yuma clapper rail was designated as federally endangered. The Yuma clapper rail is a year around resident and breeds in marsh habitats around the southeastern portion of the Salton Sea. The preferred habitat is mature cattail-bulrush stands with shallow water, although they will forage in adjacent agricultural areas. The applicant completed surveys for Yuma clapper rail along the OB3 pipeline route, and noted several individuals were present in the project area (CEOE 2002a, Figure 5.5-1). The project area has many mature cattail-bulrush stands and open water areas.

Riparian Birds. Both the New River and Alamo River have areas of mature riparian habitat, mostly dominated by tamarisk (*Tamarix* spp.). The federally and state listed endangered least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) are dependant on mature riparian vegetation near open water. Neither species has been observed in the project area. Yellow-breasted chats (*Icteria virens*), a state species of concern, occasionally can be found in the Salton Sea area, but normally there are less than five individuals in any given season.

California Black Rail (*Lateralus jamaicensis coturniculus*). The California black rail is a state-listed threatened species that has scattered occurrences in the Salton Sink. Black rails require dense vegetation cover, but the vegetation types utilized at the Salton Sea have not been described. General surveys by Arizona Game and Fish staff in 2002 did not detect black rail within the project area, and surveys by applicant's consultants also did not detect birds. The Wildlife Refuge lists the black rail as having occasional use, normally less than five individuals per season.

Mountain Plover. Mountain plover (*Charadrius montanus*), a federally proposed threatened species and a state species of concern, is usually associated with agricultural fields (especially those that were recently cleaned or burned). The amount of suitable habitat in the area varies across the landscape and over time. The species is documented within the project area (CEOE 2002a, page 5.5-8).

Burrowing Owl (*Athene cunicularia*). Burrowing owls, a state species of concern, inhabit open areas such as grasslands, pastures, coastal dunes, desert scrub, and the edges of agricultural fields. They use rodent burrows or construct burrows in semi-compacted soil in the slopes of drainage canals nest to agricultural fields. Burrowing owls are abundant in this portion of the state, and they were found along almost the entire length of the transmission line routes (CEOE 2002a, Figure 5.5-1).

Loggerhead shrike (*Lanius ludovicianus*). Loggerhead shrike, a state species of concern, is an uncommon resident of the area. This species prefers very open and semi-open habitats where suitable hunting perches are available. The species was not

seen during avian surveys. No further analysis of this bird is warranted, as it is not expected to occur except on rare occasions for reasons unrelated to habitat quality (e.g., accidental).

Terns. Elegant terns (*Sterna elegans*), a state species of concern, are recorded at the Salton Sea less than ten times, and are not to be expected in the area. Caspian terns (*Sterna caspia*), a state species of concern, are recorded using an area just southeast of Rock Hill (1 mile northeast of Obsidian Butte) for nesting. There were an estimated 1,400 adults and 200 juveniles near Rock Hill in 1998 (CEOE 2002e, Comment BIO-2). The Van Rossem's gull billed tern (*Sterna nilotica*), a state species of concern, breeds sporadically in the Salton Sea. The main nesting location is on Rock Hill and Mullet Island, but in the mid-1990s terns nested on the shoreline of Obsidian Butte (CEOE 2002a, page 5.5-11; CEOE 2002e, Comment BIO-2).

Black Skimmer (*Rynchops niger*) Mullett Island also plays host to nesting black skimmers, a state species of concern. This species was recorded there in 1973, and also at Rock Hill in 1998.

LeConte's Thrasher (*Toxostoma lecontei*). LeConte's thrashers typically found in sparsely vegetated desert flats, dunes, alluvial fans, or other areas where saltbush (*Atriplex* spp.) or cholla cactus (*Opuntia* spp.) are present. LeConte's thrasher is absent from the irrigated portions of the Imperial Valley and the Colorado River, but it breeds in drier habitats outside of these areas (Garrett and Dunn 1981). This species was not detected during avian surveys and there are no records of this species since 1952. Suitable habitat is lacking in the immediate area of the project. No further analysis of this species is warranted as this bird is not expected to occur.

Flat-tailed horned lizard (*Phrynosoma macalli*). The USFWS determined in January 2003 that the listing of the flat-tailed horned lizard was not warranted (USFWS 2003). This species is a state species of special concern. Although native creosote bush scrub is present along the L-Line interconnection route, habitat along the route is not considered suitable for flat-tailed horned lizard. The area lacks sandy soils and there are many off-highway vehicle disturbances, which preclude lizards.

Birds of Prey. Birds of prey have found abundant prey within the agricultural fields surrounding the proposed project and are year-around residents of the area. Tall structures and poles are used extensively by the raptors. A northern harrier (*Circus cyaneus*) and two ferruginous hawks (*Buteo regalis*) were recorded over agricultural fields in the project area (CEOE 2002a, Appendix K)

Bats. Several bat species are attracted to the agricultural lands in the area for foraging on fruit and insects. Several species of bats are California Species of Concern including the California leaf-nosed (*Macrotus californicus*), Townsend's big-eared (*Plecotus townsendii*) and California mastiff (*Eumops perotis californicus*) bats.

Sensitive Habitats

The Wildlife Refuge and CDFG are managing many wetlands throughout the southern Salton Sea area. Three large complexes are within the project area: Wister Unit, Alamo river delta, and Unit 1 of the Wildlife Refuge. The Wister Unit of the Imperial Wildlife

Area includes the largest complexes of managed wetlands in the Salton Sink. The Alamo River delta has a variety of managed wetlands, some of which have been breached to become part of the Salton Sea. Unit 1, managed by the Wildlife Refuge, contains a number of cells in succession that are progressively flooded and drained.

The largest riparian area in southern Salton Sea Area is at the mouth of Thiery Creek (near Bombay Beach) about 15 miles north of Obsidian Butte. The riparian area is largely the result of long-term seepage from the Coachella Canal. The New River and Alamo River also have patches of riparian habitat along their banks and at their mouths, some of which may be disturbed during installation of the transmission lines.

Before the Salton Sea was formed, waterfowl would pass over the area during migration. Now, the open water and shoreline attract thousands of waterfowl and other birds, which spend the winter at the refuge. The many canals and drains in the area provide ribbons of open water for use by wildlife. Efforts during the 1950's to control weeds by adding herbivorous game fish to the canals creates a plentiful food supply for migrating birds.

Several islands are identified for the abundant amount of bird nesting that occurs on them; such a high density breeding area is known as a rookery. The southern edge of Salton Sea has fifteen identified rookeries and Alamo River has one (Redlands Institute 2002).

As farming in the Salton sink increased in the 1940's, so did the waterfowl's dependence on these crops for food. Flooded croplands can attract tens of thousands of waterfowl. The Wildlife Refuge manages lands throughout the area as cropland for use by wildlife.

Refuges, Wilderness Areas and Parks

Salton Sea National Wildlife Refuge (Refuge) was established in 1930 and it leases and owns lands along the southeast shoreline of Salton Sea. The Refuge also holds jurisdiction over a large portion of the open water in the southern end of Salton Sea. The primary purpose of the refuge is to protect habitat for migrating birds and for endangered species. The refuge is also important for resting, feeding, and nesting for a large number of shorebirds. Wildlife species can be found at the refuge year-round.

On February 12, 1955 the Salton Sea State Park, later to become the Salton Sea State Recreation Area, was dedicated. Salton Sea State Recreation Area is located approximately 14 miles to the northwest of the power plant site along the Salton Sea's eastern edge. The Park is managed for recreation.

The CDFG preserves and protects lands between Brawley and North Shore, near Highway 111 in the Imperial Wildlife Area. The Wildlife Area is divided into three units; Wister, Hazard, and Finney-Ramer. The CDFG also has control over the San Felipe Creek Ecological Reserve near the intersection of State Highways 86 and 78. Portions of San Felipe Creek are a BLM Area of Critical Environmental Concern.

Several parks and wilderness areas are in the region including: Joshua Tree National Park; Santa Rosa Mountains Wilderness, North Algodunes Wilderness Area (part of

Imperial Sand Dunes Recreation Area), Mt. San Jacinto State Park Cuyamaca Rancho State , and Anza Borrego Desert State. The USFWS also has three National Wildlife Refuges in the region in addition to the Salton Sea: the Coachella Valley National Wildlife Refuge near Palm Springs, and the Cibola and Imperial National Wildlife Refuges along the Colorado River. All of these areas are at least 20 miles away from the project.

LOCAL

Power Plant Site and Construction Laydown Area

The proposed Salton Sea Unit 6 (SSU6) project site is located on a 80-acre parcel along the northern portion of the block bounded by McKendry Road to the north (where the main entrance will be placed), Severe Road to the west, Peterson Road to the south, and Boyle Road to the east. The immediately surrounding area is still predominantly agriculture and 20-foot high gravel roads (berms) on the north and west boundaries, separate the project site from surrounding areas. The entire SSU6 facility consists of the following major components:

- turbine generating facilities;
- brine/steam handling;
- water treatment;
- heat rejection system (cooling towers);
- solids handling;
- brine ponds;
- control building;
- storm water drainage ditches and detention basins; and
- parking lot and administrative buildings.

These features can be viewed on PROJECT DESCRIPTION Figure 4 of this PSA.

Biological Resources Table 2 summarizes temporary and permanent disturbance within the project footprint for the plant site and other features discussed in the following text.

BIOLOGICAL RESOURCES – Table 2
Summary of Affected Acreage (CEOE 2002I, Table 5.5-1DR1)

| Feature | Area Affected during Project Construction | |
|---------------------------------------|---|---------------------------|
| | Temporary | Permanent |
| Power Plant | 0 | 80 |
| Production Wells | 0 | 26.2 |
| Injection Wells | 0 | 15.4 |
| Well Pipelines | 0 | 94.9 |
| Water Supply Line | 0.7 | 0 |
| L-Line Interconnection | 86.3 | 2.7 |
| IID Midway Interconnection | 85.4 | 2.6 |
| Pull sites | 39 | 0 |
| Bannister Switching station | Not provided | Not provided |
| T-Line Staging Areas and Access Roads | 48 | 0 |
| TOTAL | 259.4+ switching station | 221.8 + switching station |

Note: For Habitat Types impacted see original table

All the plant buildings are single story and pre-engineered. The tallest feature is the gantry crane at 99 feet tall. The site will be surrounded by an 8-foot high perimeter berm for flood control and a chain link security fence. The fence would enclose the brine ponds, and other areas requiring controlled access. The perimeter of the site will be landscaped with vegetation and there will be some minor landscaping in the interior of the property. Topsoil will be stockpiled during construction to be reused for this purpose.

The proposed brine ponds can hold approximately 4 million gallons. The brine ponds on site collect flows from three different sources: 1) brine overflow from the clarifiers and thickener during upset conditions; 2) condensate from steam vent tanks during upset conditions; and 3) reject water from reverse osmosis system (Cal Energy, Data Adequacy Response BIO-3). Flows during upset conditions would be temporary, and the applicant has indicated the brine would be pumped to a plant injection well in a timely manner. The reject water from reverse osmosis is about 720 gallons per day, and would be left in brine ponds to evaporate.

The site will be accessed during construction and operation from State Highway 86 and Bannister Road or Sinclair Road from Highway 111. During peak construction the project will add 930 vehicle trips per day along McKendry Road and 930 trips to Boyle Road (CEOE 2002a, Table 5.10-8). This number of vehicle trips is an order of magnitude higher than is experienced now (1000% increases). Other local roads may experience about a 30% increase in vehicle trips.

Switching Station

The proposed Salton Sea Unit 6 switching station is located on the west side of State Highway 86 at the intersection of Bannister Road. The station is next to a large wash where signs of coyote (*Canis latrans*), bobcat (*Felis rufus*) and kit fox (*Vulpes macrotis*) were detected in February 2002 (CEOE 2002a, Appendix K, Biological Assessment).

Staff has not received information on the dimensions of this facility and cannot make an estimate of habitat loss. Staff requires this information to complete their analysis of temporary and permanent impacts by habitat types.

Linear Facilities

In addition to the power plant site there will also be several linear facilities as described in the following text. All transmission lines would be on steel poles 120 to 125 feet tall (CEOE 2002a, Figure 3.3-13). All brine pipelines would be elevated above the ground and would be encased in insulation (CEOE 2002e, CEC Data Response 10). All well pads would be cleared and graveled (CEOE 2002e, CEC Data Response 11).

L-Line Transmission Line

The proposed L-Line interconnection is a 16-mile route along existing roads to the point where Bannister Road connects to State Highway 86, and then connects to the switching station. From this point, the transmission line follows a s-shaped route around the southern edge of a landfill to interconnect on BLM lands with the existing L-Line. Many of the roads have existing distribution and transmission lines in their shoulders, and the southern edge of Salton Sea is a web of drains, laterals, and irrigation canals operated by Imperial Irrigation District.

The applicant performed avian flyover studies in order to determine the need for bird flight diverters on both of the proposed transmission lines. (Bird flight diverters are designed to make the small grounding wire connecting the tops of transmission line poles more visible.) The applicant found bird use of the area varied based on location, and even within a single location, there are a variety of species. In general, shorebirds as a category dominated the data, flocks of cattle egrets (*Bubulcus ibis*) and red-winged black birds (*Agelaius phoeniceus*) were the most frequently encountered species (over 200 individuals of each), burrowing owls (*Speotyto cunicularia*) were frequently encountered as lone individuals or pairs, and raptors and pelicans were rarely seen and if they were it was rarely a low elevation flight.

The proposed L-Line route would cross the New River at approximately milepost 5 near Foulds Road and the IID Midway Interconnection crosses the Alamo River at approximately milepost 5 near Dewey Road. The project proposes an aboveground crossing of the New River and Alamo River. At these crossings mature tamarisk dominates the shoreline. Surrounding the river crossings are lands used for agriculture and as dairy farms. Avian flyover surveys at New River (data point OBFLY 03) and Alamo River (data point OBFLY 17) show low flights by killdeer (*Charadrius vociferus*), green herons (*Butorides virescens*), black terns (*Chlidonias niger*), northern harriers (*Circus cyaneus*), and groups of cattle egrets and gulls (*Larus* spp.). Cattle egrets dominated in both locations.

The applicant found one aquaculture farm within one mile of the proposed transmission line (CEOE 2003d, CEC Data Response 120). The applicant has been asked to provide more information on potential collision impacts to brown pelicans from the L-line interconnection near the shoreline of the Salton Sea (CURE Data Request 348).

An alternative transmission line was proposed along State Highway 86. This route would be the same as the proposed up to where Bannister Road crosses State Highway 86. This alternative would connect to the switching station (CEOE 2003d), then follow the highway corridor to where it intersects with the L-Line, about 7.5 miles to the northwest. The alternative would cross both agricultural and residential lands if on the east side, and creosote scrub if on the west side. No significant bird use of this area was found (CEOE 2002a, Section 6.2.2.5).

IID Midway Transmission Line

The proposed IID Midway transmission line route travels south for the plant site, then east, and then north again along existing roads. The route crosses lands developed in agriculture, dairy farms, and the California State Prison before terminating at the existing Midway substation. The discussion of avian flyover impacts earlier in the PSA is relevant to this transmission line as well. No undeveloped lands are crossed by this transmission line. Refuge staff identified wetlands near the corner of Brandt and Lindsey (near milepost 4) that may contain brown pelicans (January 9, 2003 Data Response and Issues Workshop).

Brine Supply and Injection Pipelines and Wellheads

The 100-foot brine supply and injection pipelines corridors (plus an additional 10% for expansion joints) traverse primarily agricultural land and are centered on paved and gravel roads. Production well pipelines OB-1, OB-2, OB-4 and OB-5 do not cross any wetland or drainage features. The production well pipeline for OB-3 crosses a wetland at McKendry Road (discussed earlier in this PSA). Drainage channels would be crossed by the injection well pipelines (OBI-1, OBI-2, and OBI-3). Around 100 acres agricultural land would be permanently lost during construction of the pipeline corridors.

The brine production well heads OB1 and OB2 would be located within an approximately 60 acre parcel of agricultural lands north of the power plant site. The entire parcel is currently leased to the Wildlife Refuge on a month-by-month basis. The Wildlife Refuge has been growing crops on these lands to benefit snow geese (*Chen caerulescens*) and widgeons (*Anus americana*) and to comply with the provisions of the Lea Act which try to reduce agricultural losses from waterfowl. The area also serves as overflow parking during some refuge events. The areas north, east and west of the plot are freshwater marshland that support Yuma clapper rail. The north and east wetlands were created by the USACE and CDFG (Union Pond) and are separated from the parcel by a 4-foot berm. The west marshland is part of the Salton Sea shoreline, and is separated from the parcel with a 20-foot berm. When the OB1 and OB2 wells are directionally drilled they would disturb a footprint of 300-feet by 700-feet and 560 foot by 560 foot respectively (a total of 12 acres). Production well pipelines (100 feet width by 3000 foot length, a total of 7 acres) will also be installed on the property. The applicant has been asked to calculate their estimate of habitat loss on this parcel (see CURE Data Request 334).

The brine production well head OB 3 would be located on the southern end of Obsidian Butte. The well pad would disturb a 300-foot by 700-foot area (4.8 acres). Obsidian Butte is a disturbed area used by Imperial Irrigation District for gravel mining. The construction of this well pad will not result in new disturbance. The islands to the

southwest of Obsidian Butte have been used as loafing areas by brown pelicans according to Refuge Staff (January 9, 2002 Data Response and Issues Meeting). The production pipeline from well head OB3 will cross a wetland feature on either side of McKendry Road. The applicant has estimated the loss of 0.8 acres of jurisdictional features. Although the applicant has proposed to mitigate this loss, they have not identified a location.

The brine production well heads OB4 and OB5 would be located on actively farmed land near the power plant facility. No unique resources were identified near these well heads or the associated production pipelines.

The injection well heads for Salton Sea Unit 6 are proposed within agricultural lands to the south and east of the proposed power plant site. Injection well pipelines would cross drainage canals, which are sparsely vegetated with cattails. These canals have the potential to support Yuma clapper rails, but none have been detected to date. Burrowing owl pairs have been found near the injection wellhead locations (CEOE 2002a, Section 5.5.1.2.7).

IMPACTS

DIRECT AND INDIRECT IMPACTS

The California Environmental Quality Act (CEQA) Guidelines define direct impacts as those impacts that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance, but are still reasonably foreseeable and related to the project. The potential impacts discussed below are those most likely to be associated with construction and operation of the project.

CEQA guidelines provide an environmental checklist to assist lead agencies in their analysis of project impacts. The headings for discussion of impacts presented in this section follow the items in that checklist, as well as items found in the Warren-Alquist act and recent Presidential (executive) orders relevant to biological resources (e.g., Executive Order 13112 for management of invasive species). Significance is generally determined by compliance with applicable LORS; however, because of the diversity of biological impacts, guidelines adopted by resource agencies may also be used. These are appropriately cited in the text.

Effect on Sensitive Species

Power Plant and Construction Laydown Area

The applicant has proposed some general measures to mitigate for impacts to sensitive species. These include the hiring of a designated Biologist to perform pre-activity plant and wildlife surveys for the species identified in **Biological Resources Table 1** (Conditions of Certification **BIO-1** through **BIO-3**), a worker environmental awareness training program (**BIO-4**); and avoidance measures (**BIO-13**). The applicant is willing to prepare a comprehensive document that will cover all biological monitoring and mitigation prescribed for the project (Condition of Certification **BIO-5**). These measures

will reduce impacts that are avoidable through employee education, pre-planning, and oversight.

The power plant and construction laydown area result in the permanent loss of 80 acres of agricultural habitat. The site is located in an agricultural landscape, which has been farmed since 1901. The loss of this type of habitat is insignificant when considering over 500,000 acres are farmed in the area. The applicant has been asked to review the impacts of agricultural land losses on Yuma clapper rail (CURE Data Request 334). Staff does not expect the loss of land at the power plant site will be a significant loss to Yuma clapper rail as it is not removing a wetland area.

During construction, the noise levels from the power plant to the nearest sensitive receptor, Yuma clapper rail habitat, would range from 51 dBA to 70 dBA. The amount is dependant on distance from the habitat (located on the north and northwest from the power plant site), and the type of equipment in use. One of the loudest noises expected from project construction is pile driving. Noise levels during this type of construction can result in levels that exceed 60 dBA L_{eq} . However, there are other ways of accomplishing pile driving that are less noisy (while still being cost effective), and there are noise barriers that can direct noises away from sensitive receptors. The applicant shall develop a Noise Assessment and Abatement Plan to attenuate this noise to a level that is acceptable to the agencies (Condition of Certification **BIO-16**; see also the NOISE section of this PSA).

During plant commissioning, the project owner would push high-pressure steam through the pipe in order to clean and test the system. This test is called a "steam blow" and it can create substantial noise unless a silencer is added. A series of steam blows would take place at the power plant to test the production and injection pipelines. Steam blows can last from one day to one week and three are anticipated for the project (CEOE 2003a, CURE Data Response 231). The project proposes to include a silencer on the steam blows such that the resultant sound level at Yuma clapper rail habitat is 58 dBA (CEOE 2002a, Section 5.5.2.1; CEOE 2003a, CURE Data Response 231). Because the steam blows could occur at any time of year, a silenced steam-blow is required by staff to ensure avoidance of impacts to Yuma clapper rail during the breeding season (Conditions of Certification **BIO-12** and **BIO-16**).

Staff sponsored a Data Response and Issues Workshop with the public and agency staff on January 8, 2003. Several types of pre-construction monitoring were suggested to lessen the impact of project on sensitive species. The applicant had already agreed to pre-construction monitoring for burrowing owls (Condition of Certification **BIO-19**), but monitoring of other species such as brown pelicans, Yuma clapper rail, and black rail surveys should be completed (Condition of Certification **BIO-14**) so avoidance measures can be prescribed by the Designated Biologist. Because of the seasonal abundance of species, the recommendation is to survey when the species are common to abundant so that a false-negative (assuming absence when really present) would not be expected.

Each of the brine ponds on site are designed hold about 4 million gallons of water (CEOE 2002I, CEC Data Response 85). The emergency brine overflows and condensate would create temporary water accumulation in the brine ponds

approximately 18 times per year for 24 hours (CEOE 2002I, CEC Data Response 83). At the time of upset, brine would be at approximately the re-injection temperature of 230-240 degrees Fahrenheit (CEOE 2002a, Section 3.2.2) which is just at the boiling point of water. The rising heat from the brine would discourage wildlife use until cooled to less than boiling, and the heat would kill any plant or invertebrates that may be present along walls or shallow depressions. Other open water sources that are not next to industrial development are readily available, so use of the brine ponds would be unlikely. The applicant has indicated the brine would be re-injected in an expeditious manner, limiting the opportunity for wildlife to find the pond. Therefore no wildlife use during emergency upset conditions is expected and no impact has been identified. Reject reverse osmosis water would be at such a low flow (720 gallons per day) that all ponding would be shallow (1 to 2 feet; CEOE 2003a, CURE Data Response 214), and the water is nearly equivalent to nearby canal water (CEOE 2002a, Table 5.4-4) so no impact is expected from incidental use by birds or bats.

Project traffic to and from the project site, as well as to the construction sites for the linears, will substantially increase traffic levels throughout the area. Several species, including burrowing owls and Yuma clapper rails, have the potential to be struck by project-related traffic. The applicant shall post speed-limit signs and instruct all employees, contractors, and visitors to obey those limits. If wildlife is hit, the Designated Biologist shall be contacted and appropriate actions taken (Condition of Certification **BIO-13**).

Linear Facilities

The transmission line facilities will result in the permanent loss of 5.3 acres and temporary loss 157.5 acres of agricultural and ruderal habitat (see **Biological Resources Table 2**). Almost this entire loss is in the shoulder of roads, which are disturbed by the maintenance of the laterals and drains. Staff did not find the level of habitat loss from transmission lines, outside of BLM lands, to be significant and is not requesting mitigation.

Where the L-Line interconnection crosses BLM lands, there will be some temporary disturbance of creosote scrub habitat (14.2 acres; CEOE 2002e, Table 5.5-1DR1) which is considered potential flat-tailed horned lizard habitat. The applicant will need to pay for the effects on the lizard habitat through a compensation formula developed by the Flat-tailed Horned Lizard Management Oversight Group (Condition of Certification **BIO-22**). The switching station is in already disturbed lands, so it is unlikely to result in the loss of wildlife habitat, but staff has a request for the total area of impact and the type of habitat impacted. The loss of potential lizard habitat will be fully mitigated by paying this fee. The IID does not control access to their roads, therefore some low level of unauthorized use could occur (CEOE 2002I, CEC Data Responses 20 and 21). Staff is not proposing mitigation to regulate the use of the access road as the area has already been identified as having high vehicular use.

The applicant performed avian flyover studies in order to determine the need for bird flight diverters on the proposed transmission lines (both L-Line and IID Midway Interconnections). At the Data Response and Issues Workshop on January 9, 2003 assigned staff from the USFWS stated they have questions about how the data was collected and sorted. The applicant shall continue dialogue with this agency and

Commission staff for determining where bird flight diverters should be placed to reduce collision impacts to sensitive species (Condition of Certification **BIO-17**). In addition, a post-construction biological monitoring plan shall be developed to determine whether the transmission line facilities are causing significant impacts. If it is determined that significant impacts to avian species are occurring, the agreed upon remedial mitigation measures will be implemented (Condition of Certification **BIO-17**).

Several sensitive species were seen flying perpendicular to the transmission line routes during the avian flyover surveys. There is evidence of collision hazards with distribution lines for brown pelicans, but it is unclear if there is a collision hazard from transmission lines (which are much taller and heavier gauge). The proximity of open water to the transmission line will be the best indicator of where the hazard occurs. The segment of L-line interconnection between milepost 1 and milepost 3 is less than 1,000 feet from the shoreline of the Salton Sea. Continuing the line along Crummer Road for one mile, and then turning west on Young Road (instead of on Lindsey Road) could reduce the potential impact. Staff is still reviewing materials and is awaiting response from the applicant before making a determination of impact or suggesting final mitigation (CURE Data Request 348).

Transmission lines located in areas identified as highly sensitive migratory areas will be designed to comply with Avian Power Line Interaction committee (APLIC) suggested practices (CEOE 2003a, CURE Data Response 210). Impacts to sensitive birds (such as raptors or brown pelicans) from electrocution are not expected after implementation of this measure (Condition of Certification **BIO-12**) and monitoring will confirm the success of APLIC measures (Condition of Certification **BIO-17**).

The project proposes an aboveground crossing of the New River and Alamo River where mature tamarisk dominates the shoreline. Although this habitat could be used by either least Bell's vireo or southwestern willow flycatcher, there is only one recorded occurrence of willow flycatcher, near Niland in 1952, and no occurrences of vireo. Avian surveys for the project in 1989, 1994, and 1999 to 2002, did not detect either species at New River or Alamo River. No impacts to these two species is expected from construction or operation of the proposed transmission lines.

The construction of OB1 and OB2 wellheads on lands north of the power plant site will place people and equipment within close proximity (890 feet) to wetlands known to contain Yuma Clapper rail, and which may contain black rail. The noise levels during the construction (or re-drill) of a wellhead would be expected to be between 70 dBA and 90 dBA at 50 feet from the source and work is done around the clock for up to 21 days. During operations, the plant operators would inspect the pipelines using graveled roads approximately 3 times per 24-hour period (CEOE 2002I, Data Response 12) and crews may perform schedule maintenance at the well head (CEOE 2002I, CEC Data Response 18). Noise from approaching vehicles, approximately 86 dBA at 50 feet from the source, could occur during any time of day or season (CEOE 2002I, CEC Data Responses 17 and 18). During shutdown maintenance, typical construction equipment would access the site and sound levels would be expected to be between 70 dBA and 90 dBA at 50 feet from the source (CEOE 2002I, Data Response 13). The County should develop noise abatement measure(s) to attenuate the noise from construction,

operations, and maintenance at OB1 and OB2 to less than 60 dBA at the sensitive receptor or a level that is acceptable to the agencies.

The construction of OB3 wellhead on Obsidian Butte would place people and equipment within close proximity of a brown pelican loafing area, and an area that has been used for nesting. Salton Sea Refuge Staff indicated during Data Response and Issues Workshop (January 9, 2003) that brown pelicans use the islands to the west of Obsidian Butte in the summer and there may be a noise impact to this species. The impact of construction noise was not analyzed by the applicant. The applicant agreed only to schedule shut down maintenance of production well OB3 outside of the shore-bird breeding season (CEOE 2002I, Data Response 13). The County should adopt pre-construction monitoring of brown pelican use to establish a baseline condition to allow prescription of avoidance measures and surveys during construction to determine the success of the avoidance measures. The County should require that the applicant delay shut-down maintenance at production wellhead OB3 or its pipeline until outside of the shorebird breeding season.

The construction of the production and injection wellpads and pipelines may result in habitat losses to mountain plovers, but there was insufficient information provided to determine the level of impact. To evaluate the potential impacts on mountain plovers, staff requires additional information on:

- numbers of wintering mountain plovers for as many years as the information is available and a map of their locations for the past 3 years of data (if available)
- habitat associations for those birds in the Imperial Valley
- distribution of those field types around the valley including acreage (both a map and table)
- any information on the impact zone around existing brine pipelines that can be provided for the mountain plover (i.e., how far do they stay away from these facilities due to noise, activity, and/or impacts to their sighting distance)

Staff will use this information to determining the potential for habitat loss and the level of significance. The County should offset any impacts found to be significant.

CDFG found 53 desert pupfish individuals south of McKendry Road in August 1994. Subsequent surveys by CDFG in 1998 and 2000 did not detect desert pupfish (CEOE 2002I, Data Response BR-16). The applicant completed surveys for desert pupfish on February 9, 2002 (CEOE 2002I, Data Response BR-16) along the proposed pipeline route from the plant site to OB3, and no pupfish were detected. No impacts to this species are expected from construction of the OB3 brine pipeline and expansion of McKendry Road so long as Best Management Practices are followed (see SOIL AND WATER RESOURCES section in this PSA).

Several burrowing owls were detected near the injection wellheads. The County should require pre-construction surveys and compensation for any losses in a manner that is consistent with Condition of Certification **BIO-19**.

Effect on Sensitive Habitat

Wetland Losses

The power plant and laydown areas are not located in or near any surface waters or federally protected wetlands or other jurisdictional waters and therefore, there is no direct loss of this sensitive habitat. There is no change in the open water habitat in Salton Sea as a result of the project (see CEOE 2002I, Data Response 15), and therefore no further review of impacts is necessary. There is no proposed change to the amount of open water in the canals, and therefore no further review of impacts is necessary.

All the jurisdictional wetlands impacted by the project are related to the installation of OB3 pipeline and road expansion (McKendry Road). The pipeline crossing the McKendry road segment would be designed as a double-walled pipeline, encased in concrete, isolated by block valves at the well head and along the pipeline, and would be monitored both externally by daily visual inspections, and internally by pressure monitors. The 0.8 acres of jurisdictional areas affected are broken down by habitat type below (CEOE 2002a, Appendix K, Jurisdictional Delineation Report):

- 0.05 acres of brackish marsh
- 0.03 acres of other waters of the U.S. in the form of open water
- 0.02 acres of desert sink scrub
- 0.3 acres of tamarisk scrub.

The applicant has submitted an application to obtain a CWA 404 permit issued by the USACE and a 401 water quality certification issued by the RWQCB for the fill of degraded wetlands. The applicant proposed to the USACE that they would mitigate the impact to jurisdictional wetland with creation or enhancement of 0.8 acres of habitat (CEOE 2002a, Appendix K) if it was made part of the permit conditions. The applicant has not provided a location for the creation and enhancement, and the USACE is delaying issuing the permit until they have a specific plan (J. Baker, personal communication). The applicant has been asked to provide more information on the availability of compensation land (CURE Data Request 338). The USFWS consultation on the installation of pipeline did not result in any terms and conditions so long as the construction takes place as described and outside of the Yuma clapper rail breeding season (USFWS 2002). A Fish and Game Code 1603 permit is required from the CDFG, but has not been issued to date. Construction within the wetland area will be subject to the conditions of the USACE permits, which will incorporate the USFWS request that construction must take place outside of the Yuma clapper rail breeding season. The applicant has agreed to provide the safest design possible for the wetland pipeline crossing (CEOE 2002I, CEC Data Response 24). The County should ensure the pipeline is built as described in CEC Data Response 24 and any materials provided to USFWS, and adopt the USFWS measure to construct outside the breeding season as part of their permitting. No impact is expected after implementation of the permit terms.

Of the combined four mile length of production and injection pipelines, only about 0.25 miles crosses areas that are marsh or wetland habitat (CEOE 2003a, CURE Data

Response 212). The applicant has agreed to build the portion of pipeline which crosses jurisdictional wetland (see paragraph above) in a double-walled pipe, but the remainder would be in single walled pipe. If either the production or injection pipelines were to rupture and spill, there may be direct or indirect impacts to sensitive aquatic resources depending on size of the spill and location relative to drains, wetlands, or other sensitive habitat. The applicant estimates the amount of brine released during a spill would be 200 to 400 gallons, and would remain within a 20 to 30 foot radius (CEOE 2002I, CEC Data Response 10). The applicant shall provide an emergency plan for notification and clean-up at the facility which takes into account the sensitive biological resources in the area (Condition of Certification **BIO-20**). Staff recommends the County request a similar plan and require a stringent design where the pipeline crosses wetlands during their permitting of the brine pipelines and wellheads, as this would reduce the impact to less than significant.

The brine pipelines are made from a specially designed pipe with a concrete liner. During storage and shipping, the pipes are filled with water to prevent drying or cracking of the liner. The applicant has proposed to empty the sections of pipe directly at or near its installed location provided that adequate flat surface is available to safely store the fluid (CEOE 2002I, CEC Data Response 10). During construction of the pipeline between OB3 wellhead and the power plant site, the pipes will be drained at the power plant site (ibid). No impacts to wetlands are expected when following this design (Condition of Certification **BIO-12**).

Riparian Habitat Losses

There are two major river crossings by the applicant's transmission lines. Both the New River and Alamo River contain riparian habitat and are used by numerous birds for migration corridors. There would be little or no habitat loss because the transmission line towers are located on upland areas and no mitigation is requested by staff.

Impacts to Salton Sea Islands (Rookeries)

Birds are especially sensitive to noise during the breeding season. If they are significantly impacted, they will abandon their nesting position and the nest will fail. Noise levels from the power plant site would be below the threshold of 60 dBA at these islands. Noise levels from construction of OB3 wellhead may exceed this threshold depending on the equipment used. Staff recommends the County request a pre-construction model of noise levels based on the final design, and adhere to the mitigation recommended in such a plan (see Condition of Certification **BIO-16** for an example measure). In addition, staff recommends the County consider pre-construction monitoring to document levels of pelican use and the prescription of avoidance measures, and construction monitoring to evaluate success of avoidance measures and the need for remedial action. Implementation of these measure would reduce impacts to less than significant levels.

Impacts to Crop Lands

Migrating birds have become highly dependent on the crop lands in the southern Salton Sea area for forage. A complete loss of crops on Wildlife Refuge lands (either in ownership or leased) would be a significant impact since it would be counter to the

Wildlife Refuge's management goals and could result in injury to a federally or state listed species. At concentrated levels, many of the emissions from SSU6 are known to cause plant injury or death.

Hydrogen sulfide is one of the non-condensable gases, which are emitted from the proposed project's cooling towers. The applicant has proposed technologies which control 99.5% of all sulfur emission before they leave the cooling tower during normal operations (see AIR QUALITY section in this PSA). Impacts from operations will create concentrations of 7.5 micrograms per cubic meter hydrogen sulfide as averaged over a one hour period at ground level (CEOE 2002a, Table 5.1-49). Highest 1-hour hydrogen sulfide concentrations from well flow testing is 36 micrograms per cubic meter and 148 micrograms per cubic meter from plant commissioning (steam blow; CEOE 2002a, Table 5.1-46). These are both short term events and they only occur briefly in the lifetime of the project. Background hydrogen sulfide levels are estimated at 24.6 micrograms per cubic meter averaged over a one-hour basis (CEOE 2002a, Table 5.1-16). Most of the crop species tested have not been injured when exposed to concentrations of less than 120 micrograms per cubic meter (five-hours of fumigation) and some can withstand concentrations of 1,200 micrograms per cubic meter with no injury (EPA 1978). Based on the modeled emission amounts, staff does not expect impacts to crops from hydrogen sulfide concentrations during operations or well-flow testing, but crops may sustain some less than significant impacts (<50% loss of leaves) during commissioning activities.

The emission models estimate that ammonia, in combination with NO₃ and NO_x, will deposit at a rate of 0.00198 kg/ha-year. Ammonia emission levels in the form of cooling tower drift above are approximately 0.001 micrograms per cubic meter per year or 0.0037 pounds per hour. The highest concentration from the project would be 25.8 micrograms per cubic meter (37 ppm⁴, annual average; CURE Data Request 299). By comparison moderate application rates of nitrogen fertilizer at 20 pounds per acre is equivalent to 2200 micrograms per cubic meter (CEOE 2003a, CURE Data Response 225 and 226). Concentrations in cities varies between 0.00014 and 0.018 micrograms per cubic meter (EPA 1978), and since this is not a regulated pollutant, data is unlikely to be available close to the proposed project. Concentrations of 38 micrograms per cubic meter require one hour to injure plants such as buckwheat, sunflower and tomato (EPA 1978). Because the project's maximum emission amount is below 38 micrograms per cubic meter, no impacts to crops are expected.

The highest one-hour concentration of sulfur dioxide from the project is 146 micrograms per cubic meter (CEOE 2002a, page 5.5-20). When using alfalfa as the most sensitive of plants, researchers found impacts began when exposed to concentrations of 3,144 micrograms per cubic meter for one hour (EPA 1978). Because the project's emissions are well below this limit, no impacts to crops are expected.

⁴ Staff used NIOSH Manual of Analytical Methods, Fourth Edition, 1994

Impacts to Refuges, Wilderness Areas, and Parks

Habitat Loss

The installation of production wells OB1 and OB2 will require IID to terminate their month-to-month lease with the Refuge for the 60-acres north of the power plant site. While use of Refuge lands is severely restricted under Section 25527 of the Public Resources Code, the lands will return to private hands once the lease is terminated, and the Energy Commission does not have jurisdiction over production wells. The impact of these production wells and pipelines is discussed further under COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS. At a minimum, some amount of foraging lands under the jurisdiction of the Refuge will be temporarily unavailable to migrating birds during the construction period of OB1 and OB2 and a smaller amount would be permanently lost.

Deposition Effects

Certain national parks and wilderness areas are given special protection under the visibility program and for air impacts from new sources under the Clean Air Act and are referred to as Class I areas. Joshua Tree National Park (Park) contains a Class I wilderness area 35 miles to the north of the power plant. Modeling found the nitrogen deposition rate at the Park was 0.00198 kg/ha-yr. Because this is not a combustion fuel power plant, the amount of nitrogen deposition was quite low compared to similar siting cases which could also impact the Park ⁵. The modeled nitrogen and sulfur deposition rates at all the National Park and Wilderness areas were lower than the deposition analysis thresholds (DAT)⁶ used by National Park Service and USFWS to trigger a management concern for deposition from a single source and no impact is expected (NPS 2002; CEOE 2002a, Section 5.1.2.7.2 page 5.1-42 and -43; CEOE 2002l, CEC Data Response 29).

Movement or Migration of Fish and Wildlife

Wildlife will often use areas of dense cover, such as riparian corridors, or major geographical features, such as canyons, as migration corridors. The construction of Salton Sea Unit 6 plant site and linear facilities would not remove any areas of dense cover. Brine production and injection pipelines are insulated and would be placed above ground on stilts, allowing free passage of species underneath without harm (Condition of Certification **BIO-12**). Well pads are small features located in agricultural fields and would allow for continued movement of species around them.

The proposed transmission lines cross the New River and Alamo River which have segments of riparian vegetation and are used extensively by migrating birds. The applicant has proposed to place bird flight diverters on any lines where avian collisions are expected. With implementation of a bird flight diverter monitoring plan, no impacts would remain unless significant losses are found during post-construction monitoring (Condition of Certification **BIO-17**).

⁵ A >500 MW natural gas fired power plant, over 30 miles distant from Joshua Tree National Park, has a nitrogen deposition of approximately 0.009 kg/ha-yr and sulfur deposition is approximately 0.0001 kg/ha-yr.

⁶ The DAT for the western United States is 0.005 for both pollutants.

Conflict with Adopted Plans

Coachella Valley Natural Communities Conservation Plans (proposed)

The Coachella Valley Association of Governments has prepared an Administrative Review Draft which reflects the work of the Scientific Advisory Committee, the Implementation Subcommittee, and the Project Advisory Group. After receiving comments from the local, state and federal agencies, a Public Review Draft and Draft EIR/EIS is scheduled for release in early 2003. Staff will review the plan, if the material is posted prior to the Commission decision, and make a recommendation on the proposed project's compatibility with the plan.

California Desert Conservation Act Plan (CDCA)

The CDCA Plan designated utility corridors in its Energy Production and Utility Corridor Element (CDCA 1980, as amended). While the current proposed connection to the L-Line is outside of the existing corridor, the CDCA Plan does allow amendments to reflect changing conditions. If the applicant's proposed transmission line corridor is approved as an amendment to the CDCA, then no conflict with this plan will exist. The applicant will be required to provide copies of the amendment prior to construction (see LAND USE section of this PSA).

Laws Relating to the National Wildlife Refuge System Lands

The proposed project does not use lands dedicated to the refuge and does not change public use or access to the refuge. The Salton Sea Wildlife Refuge has not published a comprehensive conservation plan. Staff will evaluate the compatibility of the proposed project with the comprehensive conservation plan if it is published prior to the Commission Decision. There are no conflicts identified with the refuge system except as it relates to lands that are under lease to satisfy Lea Act obligations.

Salton Sea Restoration Act of 1998

As directed in the Salton Sea Restoration Act of 1998, Salton Sea restoration studies are currently under way and will identify a variety of alternatives for stabilizing salinity at the sea (Salton Sea Authority and BOR 1999). Numerous physical and/or chemical engineering and scientific research study initiatives have been implemented. Examples of these research efforts include a 12-acre solar evaporation pond project and a Vertical Tube Evaporation, or VTE, pilot study using geothermal energy, in cooperation with Cal Energy. The proposed project will not disrupt the actions being taken to correct the salinity problems related to Salton Sea, and may benefit the efforts being made if it is determined more electrically-intensive measures are needed to reach salinity goals.

Recreation Area Management Plan (RAMP) for the Imperial Sand Dunes

The BLM adopted a Recreation Area Management Plan (RAMP) for the Imperial Sand Dunes in 1987. The BLM published a draft Environmental Impact Statement (EIS) and draft revision to the RAMP in 2002. The alternatives evaluated in the draft revision to the RAMP are related to recreation and travel restrictions, and the document does not address impacts from air pollutants other than dust (PM-10). No impact to the original or draft RAMP would be expected from the proposed project.

Flat-tailed Horned Lizard Rangewide Management Strategy

The Flat-tailed Horned Lizard Working Group of the Interagency Coordinating Committee (committee) prepared the Flat-tailed Horned Lizard Rangewide Management Strategy (Management Strategy) to provide guidance for the conservation and management of lands for the lizard. These lands are found in southwestern Arizona, southeastern California, and adjacent portions of Sonora and Baja California Norte, Mexico. The Management Strategy calls for the establishment of five flat-tailed horned lizard management areas where surface disturbing activities would be limited. Land alterations outside of these management areas would not be restricted, but special mitigation and compensation measures would be applied as needed. The closest Management Area is West Mesa, outside the proposed project's footprint. The applicant would need to follow the committee's recommendations (such as having a worker education program) to ensure compliance with the Management Strategy. After incorporations of the relevant portions of the Management Strategy into the BRMIMP (Condition of Certification **BIO-5**) no conflict would remain.

Effects on Commercial or Recreational Species

The proposed power plant site and construction lay down area are not identified as habitat for commercial or recreational species, and the loss of this habitat is not expected to cause a decrease in these species. The construction of production well pads OB1 and OB3 will take place on lands where snow geese and widgeon hunting is allowed. If the construction were to take place during snow geese and widgeon hunting season, there would be a slight loss of hunting opportunities by hunters. The County should evaluate this impact, and propose alternative parking locations for hunters as mitigation for this impact. If hunting will no longer be allowed on this parcel, in order to protect the geothermal pipeline, the County should evaluate this impact, and propose alternative hunting locations.

Effects from Invasive Plant or Wildlife Species

The power plant site and related linears are in an intensively farmed area where the application of pesticides and herbicides is common place. However, weed seeds are long lived, and are prone to germinate under disturbance conditions. Areas that have temporary disturbance shall be contoured and invasive weed species controlled (Condition of certification **BIO-18**). No impact will remain after implementation of this measure.

CUMULATIVE IMPACTS

CEQA defines cumulative impacts as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” (CEQA Guidelines, Cal. Code Regs., Title 14, §15355). Cumulative impacts can occur when individually minor but collectively significant projects take place at nearly the same time frame or compound over time.

The identification of projects under the cumulative impacts analysis was based on permit records and the Draft Habitat Conservation Plan for the IID Water Conservation and Transfer Project (CEOE 2002a, Sections 5.5.3 and 5.17.2). Two of the projects are linear in nature, the Baja Pipeline and the improvements to State Route 76/111

expressway. Neither linear project crosses with components of the proposed project, and their construction may not occur concurrent with the project, so no cumulative impacts from noise, traffic, or lighting are expected. Projects related to the improvement of salinity at the Salton Sea are small in scale and isolated from the proposed project, so no cumulative impacts from noise, traffic, or lighting are expected.

The Imperial Irrigation District (IID) is involved in large scale water transfers that may require the fallowing of agricultural lands throughout the area. The area currently contains approximately 500,000 acres in agriculture and IID is opposed to fallowing because of the impact on the local economy. It is uncertain at this time if IID proposal will result in fallowing land, but if IID goes forward with fallowing, the loss of the 173 acres from the proposed project will be lost in the sheer size of IID's plan. The remaining agricultural lands would be evaluated in IID CEQA documents, and IID must determine whether there are adequate agricultural lands for wildlife protected by CDFG and USFWS in the area. At this point, the IID will be considering the loss of agricultural lands from the proposed project when they make their CEQA determination in the future, and staff found no cumulative losses to wildlife is expected from this proposed project.

FACILITY CLOSURE

Sometime in the future, the Salton Sea Unit 6 and wells would experience either a planned closure, or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. To address facility closure, an "on-site contingency plan" would be developed by the project owner, and approved by the Energy Commission Compliance Project Manager (CPM). Facility closure mitigation measures will also be included in the Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP) prepared by the applicant.

The surrounding area is predominantly agricultural, including the area proposed for the project. At the plant site and construction laydown areas no sensitive habitats or vegetation dominated by native species will be cleared or disturbed. Linear facilities (i.e., transmission lines from the plant, brine pipelines) will permanently alter some agricultural lands, and one area of creosote bush scrub.

If the power plant facilities are closed after an anticipated 30-year operational period, the surrounding areas may be still intensively farmed. In this case, restoration of any of the project area to natural habitat that existed prior to the current agricultural development would be even less practical.

While structures are being removed and the area is being stabilized during plant closure, all parties involved should follow measures prescribed for construction in the BRMIMP (Conditions of Certification **BIO-1**, **BIO-13** and **BIO-15**) to address potential impacts to biological resources. The equipment used, traffic, human presence and nature of the disturbance during closure is similar enough, such that application of the same mitigation measures implemented during construction would be appropriate.

MITIGATION

Applicant Proposed Mitigation

The applicant has proposed in the AFC, the proposed BRMIMP and supplementary biological information several impact avoidance measures to reduce impacts to biological resources in the area (CEOE 2002a, Section 5.5.4 and Appendix K, Biological Assessment). The applicant will:

- submit to the Compliance Program Manager (CPM) a final BRMIMP;
- designate a qualified biologist to manage all biological resource conditions of certification;
- develop and institute a Worker Environmental Awareness Program to inform construction and operations workers about biological resources associated with the project;
- design facilities to avoid impacts from lights and noise;
- perform pre-construction surveys for identified sensitive resources;
- install bird flight diverters along high use portions of the transmission lines;
- monitor hazardous areas during construction and ensure protection measures are in place;
- compensate for wetland losses;
- prepare a facility closure plan;
- work with agency staff to create monitoring plans; and
- model noise and suggest abatement measures.

These measures have been incorporated into Conditions of Certification **BIO-1** to **BIO-4**, **BIO-6**, **BIO 12** and **BIO-18** and shall be presented in the applicant's BRMIMP (**BIO-5**).

Staff's Proposed Mitigation

Pre-construction Surveys

Because of the dynamic and transient nature of wildlife use in the project area and its proximity to habitat occupied by federal or state listed threatened or endangered species, the applicant should complete biological surveys for the presence of such species prior to initiating mobilization and construction activities (Condition of Certification **BIO-14**). The protocol for such monitoring shall be consistent with USFWS and CDFG guidelines and shall be described in the applicant's BRMIMP (Condition of Certification **BIO-5**).

Preparation of Monitoring Plans

The discussion with agency staff on January 9, 2003 identified the need for several monitoring plans. Staff has identified the specific plans that will need approval prior to construction and operations of Salton Sea Unit 6. These include:

- Pre-construction and construction noise modeling and monitoring activities (Conditions of Certification **BIO-14** and **BIO-15**); and
- Post-construction transmission line monitoring.

Throughout this text, staff has made recommendations that the County require similar measures on the brine pipelines and at wellheads (see section below).

Purchase of Emission Credits

Staff identified that power plant emissions, if unmitigated, would contribute to the degradation of air quality in the basin and possibly change the composition of Salton Sea's waters. The SSU6 facility will implement BACT, which means that controls at the source will achieve the maximum reduction of nitrogen emissions technically feasible. In addition, emission offset credits will be purchased through a market system at a ratio equal or greater than 1:1 (see AIR QUALITY section in this PSA). The ratio is in part determined by whether the credits are purchased locally (smaller ratio) or regionally (higher ratio) (see AIR QUALITY). Mechanisms are in place to encourage purchase of credits locally. Although this addresses only stationary sources the objective is to ensure that the Salton Sea Unit 6 should not significantly deteriorate air quality. For these reasons staff does not presently propose any conditions of certification related to this impact.

Mitigation by Other Agencies

The preceding pages identified all the impacts that could arise from the build out of the proposed project. The Energy Commission only has jurisdiction over the power plant facility and the transmission lines. The department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) and Imperial County will be the permitting agencies for the wellheads and pipelines. We have included in our analysis the suggested mitigation measures for impacts identified, but it is up to the other agencies to impose them. In order to make a finding that all of the impacts can be mitigated either by our action or the actions of others, staff must know that all mitigation can and should be adopted as a part of a permit. Staff's recommendations regarding the permitting by other agencies are described below (see also **Table 3**).

The DOGGR would be contacted for the notice of intention to commence drilling. Nothing is required beyond the application and prescribed fee. Counties which have adopted geothermal elements may be delegated lead agency responsibilities (per the California Environmental Quality Act) for exploratory geothermal well projects and primary permitting powers for large geothermal plants (Public Resources Code Sections 3715.5 and 25540.5). Imperial County, through the Planning/Building Department, regulates the use of land for geothermal purposes through conditional use permits. Staff assumes the County will be permitting surface disturbances resulting from the wellheads and the brine pipeline and their associated noise impacts.

The agency discussion on January 9, 2003 identified many monitoring plans that would need to be performed along the brine pipelines or at wellheads. Because of a lack of jurisdiction, staff can not require these measures as part of our permitting process. Staff recommends the County should adopt into their permit the following monitoring provisions:

Observing brown pelican populations at the islands near Obsidian Butte for comparison of use factors during construction of the OB3 well pad. Data shall be collected on the number of brown pelicans present, the propensity for flight, the observable stimulus which results in flight(s), and any other factors which could help determine the level of impact.

- Observing snow geese, widgeon, and mountain plover populations within the field proposed for OB1 and OB 2 wellheads. Data shall be collected on the number present, the utilization of the area for feeding, and any other factors which could help determine the level of impact.
- Mapping mountain plover habitat within the fields adjacent to proposed brine pipelines just prior to construction and proposing mitigation for any losses from construction.
- Mapping occupied burrowing owls burrows along brine pipelines and proposing mitigation for any losses from construction.
- Monitoring of the water quality in the wetland north of McKendry Road during construction of the brine pipeline to OB3.
- Pre-construction monitoring during a wellhead maintenance or re-drilling for biological resources and notification of agencies prior to commencing.

Staff recommends the County require a biologist work with the wellhead and pipeline construction crews, and prepare a worker education program (see Conditions of Certification **BIO-1** through **BIO-4** for example measures). Staff recommends the County should require the applicant construct well pad cellars to prevent wildlife entry or entrapment.

Staff recommends the County require the applicant to design the pipelines which must cross wetlands with automatic shutoff valves and use double wall construction. Per the USFWS consultation on the project by USACE, the County should require construction in the wetlands north of McKendry road outside of the Yuma clapper rail breeding season.

The County will need to evaluate the level of impact the wellheads and brine pipelines have on Lea Act lands and propose mitigation to the Wildlife Refuge. The applicant should be required to locate and procure a lease of 19 acres of agricultural lands to compensate permanent losses from OB 1 and OB3 wellpads and pipelines. To verify that these measures have been adopted into a permit, staff has requested a copy of the County permit, and will request the terms and conditions of the permit become incorporated into the BRMIMP (Condition of Certification **BIO-21**).

The BLM, as a federal agency, can require any level of mitigation on its lands which will meet the agency needs under the National Environmental Policy Act (NEPA). The level of mitigation in NEPA is different than that required in CEQA. Staff will require a biologist work with the construction crews and prepare a worker education program (see Conditions of Certification **BIO-1** through **BIO-4** for example measures). Staff also requires a review of avian collisions with transmission lines on BLM lands (see **BIO-14**). If burrowing owls exist along the segment of L-line on BLM lands, burrowing owl

mitigation will be required (see **BIO-19**). Staff recommends BLM require these same measures.

We recommend that Imperial County and the BLM incorporate the appropriately noted mitigation measures and conditions (or equivalent ones) from **Table 3** into their environmental analysis and decision documents.

**Biological Resources Table 3
Recommended Conditions of Certification
For Protection of Biological Resources**

| Condition of Certification | Imperial County | BLM |
|-----------------------------------|------------------------|------------|
| BIO-1 | X | X |
| BIO-2 | X | |
| BIO-3 | X | |
| BIO-4 | X | X |
| BIO-5 | | |
| BIO-6 | | |
| BIO-7 | | |
| BIO-8 | X | |
| BIO-9 | X | |
| BIO-10 | | |
| BIO-11 | X | |
| BIO-12 | | |
| BIO-13 | X | X |
| BIO-14 | X | |
| BIO-15 | X | |
| BIO-16 | X | |
| BIO-17 | | X |
| BIO-18 | X | X |
| BIO-19 | X | X |
| BIO-20 | X | |
| BIO-21 | | |
| BIO-22 | | X |

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

POWER PLANT AND CONSTRUCTION LAYDOWN AREA

Federal and State Endangered Species Act

The applicant will need to consult on the impact of construction and operation of the power plant with the USFWS, as well as the CDFG, to ensure compliance with the state and federal ESA for potential impacts to listed species. The BLM is the federal lead for this consultation, and with issuance of the Biological Opinion and CDFG Conformance, the project would be in compliance with the state and federal ESA. The terms and conditions of these permits will be incorporated as conditions of certification (**BIO- 7** and

BIO-10) to ensure that any related impacts are reduced to levels that are less than significant.

Imperial County General Plan: Noise Element

The applicant has identified noise as potentially impacting riparian birds. The noise levels during construction are estimated to be below the limits found in the Noise Element so long as steam-blows from pipelines are muffled. There are no conflicts with this existing element if a silencer is incorporated into the design (Conditions of Certification **BIO-12** and **BIO-16**).

LINEAR FACILITIES

Federal and State Endangered Species Act

The U.S. Army Corps of Engineers initiated consultation with the USFWS on October 3, 2002 (USACE 2002) for the fill of degraded wetlands to widen McKendry Road. The USFWS concurred that such an action may affect, but is not likely to adversely affect Yuma clapper rail so long as the construction and development of McKendry Road [for well pad OB-3] is scheduled outside of the breeding season (USFWS 2002a). No impact to desert pupfish was anticipated with the construction and development of well pad OB-3. Once the applicant has received the USACE permit, which incorporates all USFWS terms and conditions, then the applicant is permitted to begin the widening of McKendry Road.

The power plants site, transmission lines, wellheads, injection pipelines, and the remainder of the production lines are being reviewed separately by the USFWS. Staff expects the Biological Opinion for the remainder of the project to be completed sometime in June 2003. Once the BLM has issued their Right-of-Way permit in October 2003, which must incorporate all the Terms and Conditions from the USFWS Biological Opinion, the applicant is in compliance with this Act (see Conditions of Certification LAND-7).

Clean Water Act (404 and 401 permits)

The applicant has proposed to conserve or enhance 0.8 acres of land. However, the application has not identified a specific location, or suggested what types of wetland vegetation they plan to conserve or enhance. Although the application to the USACE has been turned in, the USACE is delaying issuing the permit until they have more details. This will also delay the Regional Board from issuing the 401 permit. Once the permits have been issued, the applicant will be in compliance with this Act.

Lea Act

As directed by the Lea Act, the Salton Sea Wildlife Refuge has rented lands in the local area to reduce the amount of agricultural losses from waterfowl. The lands north of the power plant site, where production wells OB1 and OB2 are proposed, is current a Lea Act parcel. The Refuge is concerned that the loss of this land would result in them not meeting their Lea Act obligations. While the applicant will need to revoke the lease of the land during the construction phase, there was a commitment at the Data Response and Issues Workshop on January 9, 2003 to return these lands to the Refuge at the end

of construction. The size of the well pads will remove from production approximately 12 acres and the production pipeline 7 acres. The loss of this land should be replaced with other agricultural production lands nearby to compensate the loss. Locating and procuring a lease of 19 acres of agricultural lands should be required under the County permits.

Imperial County General Plan: Conservation and Open Space Element

The applicant has proposed transmission lines across the Alamo River and New River where riparian vegetation is present. The policy of the county is to allow for such a crossing only when no other alternative is feasible. Staff has an outstanding Data Request requesting information on the feasibility of either undergrounding the IID interconnection where it crosses the Alamo River, or placing it on Sinclair Road. Staff will review the information to determine the applicant's conformance with this land use planning policy. The proposed project is not in conflict with the other policies recommended under this element of the General Plan.

UNRESOLVED ISSUES, RECOMMENDATIONS AND CONCLUSIONS

The following issues remain unresolved or pending response from federal, state and local government agencies. All items must be completed before the Final Staff Assessment (FSA) can be released:

- The USFWS will make a determination of impacts and the possibility of jeopardy to federally-listed species from the power plant and all linears, including the crossing of McKendry road wetland, after a 135-day review of the BLM's Biological Assessment, which at the time of writing was incomplete. Staff will continue to work with USFWS to determine if there are outstanding items and what the likely terms and conditions of this permit will be. Prior to publication of the FSA, staff requires a copy of the letter from the USFWS to the BLM that the Biological Assessment is complete and the 135-day review has begun.
- The California Department of Fish and Game can not issue a concurrence on desert pupfish until 30 days after the finalization of the U.S. Fish and Wildlife Service process. California black rail and least bell's vireo have not been found in the project area, so no consultation is being requested. Staff request a copy of the CDFG concurrence prior to construction, but can complete the FSA without this information.
- Staff has outstanding data request on: 1) the reasons for siting the New River and Alamo River transmission lines crossings where there were no bridges or other overhead linears; 2) mountain plover abundance and habitat use; and 3) the possibility of relocating the L-Line when close to the Salton Sea shoreline. Staff will require this information prior to the FSA.

The following issues create unique problems for the project related to biological resources:

- The CDFG can not issue an authorization for "take" of brown pelican or Yuma clapper rail. Although these species are state listed as endangered and threatened, which can allow for "take" under specific circumstances, they are both also fully protected species under Fish and Game Code 3511. (Note, this is a problem that only new state legislation can resolve). Thus, the project must show complete

avoidance of injury or death to individuals of these species during project construction and operation. Staff will continue to evaluate all conditions of certification and any changes in the project design (from any subject area) to ensure that complete avoidance has been obtained, and will request a determination from CDFG on the success of avoidance closer to publication of the FSA.

- The BLM is the federal lead on the project. During their review of a Right-of-Way application, they require an alternatives analysis of an interconnection which does not cross federal lands. At the end of their permitting review, the BLM can choose the non-federal route as the preferred alternative and deny the application to cross federal lands. If this occurs, the applicant does not have a federal lead to request Section 7 consultation from the USFWS. Thus, if the BLM does not choose the federal land route, the applicant cannot start construction until it has obtained a Section 10 permit from the USFWS (also known as a Habitat Conservation Plan). This could delay the start of construction for up to 3 years because of the lengthy approval process involved with an Habitat Conservation Plan,

The applicant is pursuing avoidance of impacts to state- and federally-listed species and is continuing to refine their mitigation. Staff and the applicant have worked closely with both the USFWS, BLM, and USACE and will continue to do so to define and mitigate all impacts.

CONDITIONS OF CERTIFICATION

Designated Biologist Selection

BIO-1 The project owner shall submit the resume, including contact information, of the proposed Designated Biologist to the Compliance Project Manager (CPM) for approval.

Verification: The project owner shall submit the specified information at least 60 days prior to the start of any site (or related facilities) mobilization. Site and related facility activities shall not commence until an approved Designated Biologist is available to be on site.

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field;
2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;
3. At least one year of field experience with biological resources found in or near the project area; and

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least ten working days prior to the termination or release of the preceding Designated Biologist.

Designated Biologist Duties

BIO-2 The project owner shall ensure that the Designated Biologist shall perform the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities:

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources Conditions of Certification;
2. Be available to supervise or conduct mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as wetlands and special status species or their habitat;
3. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
4. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (parking lots) for animals in harms way;
5. Notify the project owner and the CPM of any non-compliance with any biological resources Condition of Certification; and
6. Respond directly to inquiries of the CPM regarding biological resource issues.

Verification: The project owner shall ensure that the Designated Biologist maintains written records of the tasks described above, and summaries of these records shall be submitted in the Monthly Compliance Reports (MCR).

During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report.

Designated Biologist Authority

BIO-3 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist to ensure conformance with the biological resources Conditions of Certification.

If required by the Designated Biologist, the project owner's Construction/Operation Manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be adverse impact to biological resources if the activities continued;
2. Inform the project owner and the Construction/Operation Manager when to resume activities; and

3. Notify the CPM if there is a halt of any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the halt.

Verification: The project owner shall ensure that the Designated Biologist notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made. [5/21/02]

Worker Environmental Awareness Program

BIO-4 The project owner shall develop and implement a CPM approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation and closure are informed about sensitive biological resources associated with the project.

The WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas. Personnel shall be advised that handling of flat-tailed horned lizards by anyone is prohibited by State law without a permit;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures;
5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
6. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by video by a competent individual(s) acceptable to the Designated Biologist.

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two copies of the WEAP and all

supporting written materials prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the MCR the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date.

The signed training acknowledgement forms shall be kept on file by the project owner for a period of at least six months after the start of commercial operation.

During project operation, signed statements for active project operational personnel shall be kept on file for six months following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

BIO-5 The project owner shall submit two copies of the proposed Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to the CPM for review and approval, and to California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS) for review and comment, and shall implement the measures identified in the approved BRMIMP.

The final BRMIMP shall identify;

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
2. All biological resources Conditions of Certification identified in the Commission's Final Decision;
3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion and Bureau of Land Management (BLM) Right-of-Way permit;
4. All biological resources mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the CDFG Incidental Take Permit and Streambed Alteration Agreement and Regional Water Quality Control Board permits;
5. All biological resources mitigation, monitoring and compliance measures required in local agency permits, such as site grading and landscaping requirements;
6. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation and closure;
7. All required mitigation measures for each sensitive biological resource;
8. Required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;

9. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
10. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
11. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities - one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;
12. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
13. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
14. All performance standards and remedial measures to be implemented if performance standards are not met;
15. A discussion of biological resources related facility closure measures;
16. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and
17. A copy of all biological resources permits obtained.

Verification: The project owner shall provide the specified document at least 60 days prior to start of any site (or related facilities) mobilization.

The CPM, in consultation with the CDFG, the USFWS and any other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt.

The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval.

Any changes to the approved BRMIMP must also be approved by the CPM in consultation with CDFG, the USFWS and appropriate agencies to ensure no conflicts exist.

Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

Closure Plan Measures

BIO-6 The project owner shall incorporate into the permanent or unexpected permanent closure plan, and the BRMIMP, measures that address the local biological resources.

The planned permanent or unexpected permanent closure plan shall address the following biological resources related mitigation measures (typical measures are):

1. Removal of transmission conductors when they are no longer used and useful;
2. Removal of all power plant site facilities and related facilities;
3. Measures to restore wildlife habitat to promote the re-establishment of native plant and wildlife species; and
4. Revegetation of the plant site and other disturbed areas utilizing appropriate seed mixture.

Verification: At least 12 months prior to commencement of closure activities, the project owner shall address all biological resources related issues associated with facility closure, which is incorporated into the BRMIMP, in a Biological Resources Element. The Biological Resources Element shall be incorporated into the Facility Closure Plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

Incidental Take Permit

BIO-7 The project owner shall acquire an Incidental Take Permit from the California Department of Fish and Game (CDFG) (per Section 2081(b) of the Fish and Game Code; California Endangered Species Act) and incorporate the terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the final CDFG Incidental Take Permit. [5/21/02]

Streambed Alteration Agreement

BIO-8 The project owner shall acquire a Streambed Alteration Agreement from the CDFG (per Section 1600 of the Fish and Game Code), and incorporate the biological resource related terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the final CDFG Streambed Alteration Agreement.

Regional Water Quality Control Board Certification

BIO-9 The project owner shall acquire the Regional Water Quality Control Board Section 401 state Clean Water Act certification, and incorporate the biological resource related terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall provide the CPM with a copy of the final Regional Water Quality Control Board's certification.

Federal Biological Opinion

BIO-10 The project owner shall provide final copies of the Biological Opinion per Section 7 of the federal Endangered Species Act obtained from the U. S. Fish and Wildlife Service. The terms and conditions contained in the Biological Opinion shall be incorporated into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U. S. Fish and Wildlife Service's Biological Opinion.

U. S. Army Corps of Engineers Section 404 Permit

BIO-11 The project owner shall provide a final copy of the U.S. Army Corps of Engineers Section 404 of the federal Clean Water Act permit. The biological resources related terms and conditions contained in the permit shall be incorporated into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U.S. Army Corps of Engineers permit.

Preventative Design Mitigation Features

BIO-12 The project owner shall modify the project design to incorporate all feasible measures that avoid or minimize impacts to the local biological resources.

Protocol:

1. Design transmission line poles, access roads, pulling sites, and storage and parking areas to avoid identified sensitive resources and preferentially use previous pull sites or already disturbed locations;
2. Screen the water intake pipes that use natural waterways in a manner to avoid entrainment;
3. Avoid wetland loss to the extent possible when placing facility features;
4. Design and construct facilities to prevent brine spills from endangering adjacent properties and waterways that contain sensitive habitat;
5. Schedule disposal of brine within brine ponds as expeditiously as possible;
6. Design facility lighting to prevent side casting of light towards wildlife habitat;
7. Insulate production and injection well pipelines and flanges;
8. Prescribe a road sealant that is non-toxic to wildlife and plants and use only fresh water when adjacent to wetlands, rivers, or drainage canals;
9. Design a silencer for steam blows to ensure the level of noise is less than 60 dBA at all identified sensitive areas; and
10. Design and construct transmission lines and all electrical components to reduce the likelihood of electrocutions of large birds.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP.

Construction Mitigation Management to Avoid Harassment or Harm

BIO-13 The project owner shall manage their construction site, and related facilities, in a manner to avoid or minimizes impacts to the local biological resources.

Typical measures are:

1. Temporarily fence and provide wildlife escape ramps for construction areas that contain steep walled holes or trenches if outside of an approved, permanent exclusionary fence. The temporary fence shall be hardware cloth or similar materials that are approved by USFWS and CDFG;
2. Make certain all food-related trash is disposed of in closed containers and removed at least once a week. Feeding of wildlife shall be prohibited;
3. Prohibit non-security related firearms or weapons from being brought to the site;
4. Prohibit pets from being brought to the site;
5. Minimize use of rodenticides and herbicides in the project area;
6. Applicant shall advise all employees, contractors, and visitors of the need to adhere to speed limits and to avoid any animals, including burrowing owls, which may be encountered on or crossing the roads to and from the project site. Applicant shall also require all employees, contractors, and visitors to report all incidences of wildlife injury or mortality resulting from project-related vehicle traffic on roads used to access the project site.
7. Inspect all construction pipes, culverts, or similar structures with a diameter of four inches or greater for sensitive species (such as burrowing owls) prior to movement of pipe or pipe burial. Pipes to be left in trenches overnight or in storage areas outside of the construction laydown area, will be capped;
8. For the section of pipeline between production well OB3 and the power plant site, empty the concrete-lined pipe at the power plant site. For all remaining sections, empty concrete lined pipe into designed evaporation and percolation ponds;
9. Report all inadvertent deaths of sensitive species to the appropriate project representative. Injured animals shall be reported to USFWS and CDFG and the project owner shall follow instructions that are provided by USFWS and CDFG. All incidences of wildlife injury or mortality resulting from project-related vehicle traffic on roads used to access the project shall be reported in the MCR.
10. Implement standard mitigation measures for the flat-tailed horned lizard detailed in the *Flat-tailed Horned Lizard Rangewide Management Strategy-Appendix 3* for work in flat-tailed horned lizard habitat.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP.

Pre-Construction Monitoring to Avoid Harassment or Harm

BIO-14 The project owner shall perform pre-construction monitoring to establish species baseline and to provide data on the occurrence of special status species. Pre-construction monitoring shall be completed when the species is common or abundant (as defined by the Salton Sea National Wildlife Refuge Watchable Wildlife Guide of 1997), but no more than 13 months prior to the start of construction, unless otherwise noted. Based on results, the construction manager shall schedule activities in sensitive locations to avoid or minimize impacts to the local biological resources as directed by the BRMIMP.

Verification: The project owner shall provide the specified data at least 90 days prior to start of any site (or related facilities) mobilization unless specified otherwise. The final Pre-Construction Monitoring Plan shall identify survey protocol and types of data collection for at a minimum:

- Observing brown pelicans at the marsh near Black and Lindsey Roads. Data shall be collected on the number of brown pelicans present, the propensity for flight, the observable stimulus which results in flight(s), and any other factors which could help determine the level of impact.
- Observing black rail populations in the marsh north of McKendry Road using the accepted protocol. Data shall be collected on number of callbacks and location.
- Observing Yuma clapper rail populations in the marsh north of McKendry Road using the accepted protocol. Data shall be collected on number of callbacks and location.
- Mapping mountain plover habitat within the fields adjacent to proposed transmission lines just prior to construction and estimating losses from construction.
- Mapping occupied burrowing owls burrows along transmission lines (see Conditions of Certification **BIO-19**).
- Flat-tailed Horned lizard surveys per Bureau of Land Management Guidelines.

The CPM, in consultation with the CDFG, the USFWS (both refuge managers and division staff) and any other appropriate agencies, will determine the survey report(s) acceptability within 45 days of receipt.

Construction Monitoring to Avoid Harassment or Harm

BIO-15 The project owner shall perform construction monitoring to ensure construction impacts remain at or below levels of significance set forth in the BRMIMP.

Verification: The project owner shall provide a protocol for monitoring during construction the following sensitive resources at a minimum:

Yuma clapper rail habitat

Occupied burrowing owls burrows along transmission lines

Any sensitive species identified during the pre-construction surveys that had not been previously documented.

The project owner shall provide the specified documents at least 60 days prior to start of any site (or related facilities) mobilization unless specified otherwise. The CPM, in consultation with the CDFG, the USFWS (both refuge managers and division staff) and any other appropriate agencies, will determine the survey report(s) protocol acceptability within 45 days of receipt.

The project owner shall provide the results of the monitoring in the MCR.

Noise Management to Avoid Harassment or Harm

BIO-16 The project owner shall prepare a detailed Noise Assessment and Abatement Plan based on the final design of the facility to determine the most practicable measures to reduce/mitigate construction noise impacts. At a minimum, the Noise Assessment and Abatement Plan shall address the measures to reduce pile-driving and steam-blow to less than 60dBA at the northern and western boundaries of the power plant site. The project owner shall provide evidence that construction noise in identified sensitive areas have not exceeded the threshold of 60 dBA, and if evidence of higher levels is found, shall engineer a protective design to reduce levels below 60 dBA, or delay construction to an acceptable range of dates. Other avoidance measures can be considered for approval by the CPM in consultation with involved agencies.

Verification: The project owner shall submit five copies of the Noise Assessment and Abatement Plan to the CPM prior to start of any site (or related facilities) mobilization. The Noise Assessment and Abatement Plan shall identify all noise sources, the location of all biologically related sensitive receptors, and the noise levels expected after the implementation of mitigation. The CPM, in consultation with the CDFG, the USFWS (both refuge managers and division staff) and any other appropriate agencies, will determine the Noise Assessment and Abatement Plan's acceptability within 45 days of receipt.

The project owner shall appoint a person(s) to collect data on a weekly basis and pass along the results utilizing the following basic protocol requirements:

- If an area is not identified in the Noise Assessment as sensitive, but exceeds the 60 dBA, it shall be noted in the data for the MCR; or
- If an area is identified in the Noise Assessment as sensitive, and noise exceeds 60 dBA, then everyone on the agency call list shall be notified as to the noise level, its source, and the remedial action that is recommended. The approved remedial action should be implemented immediately after approval by agency staff.

The results of the weekly data collection shall be incorporated into the MCR.

Overhead Transmission Line Monitoring to Avoid Harassment or Harm

BIO-17 The project owner shall install an agency-approved marker on the grounding wire of the proposed transmission lines. These markers shall be placed and maintained in all locations where the number of birds flying perpendicular to the proposed lines exceeds an agency-approved threshold. Monitoring of the effectiveness of the markers shall be implemented for the first two years of operation, and may continue for up to ten years (to determine effectiveness of remedies) if impacts are found to be excessive by a working group of interested agency personnel.

Verification: The project owner shall submit five copies of a Bird Collision Deterrent Proposal and Monitoring Plan (BCDM Plan) to the CPM 60 days prior to start of transmission line mobilization. The BCDM Plan shall identify all species of concern, the threshold used for determining impacts, the proposed location of markers, the post-construction monitoring plan, and remedial actions. The CPM, in consultation with the CDFG, the USFWS (both refuge managers and division staff) and any other appropriate agencies, will determine the BCDM Plan's acceptability within 45 days of receipt.

Re-vegetation for Construction Impacts

BIO-18 The project owner shall contour all temporary disturbance areas and allow them to naturally re-vegetate with pre-disturbance native species. Invasive exotic species (as defined by the U.S. Department of Agriculture) shall be precluded from establishing themselves in the temporary disturbance areas through implementation of a three-year post-construction weed removal program.

Verification: The applicant shall provide a brief report of temporary disturbance conditions at the end of the project construction in the BRMIMP Closure Report. Annual reporting of weed abatement shall be provided to the CPM in the annual reporting for three years post-construction, or until such time as the CPM determines it is no longer needed.

Survey and Provide Habitat Compensation for Burrowing Owls

BIO-19 The applicant shall survey for burrowing owl activities on the 80-acre parcel and along the transmission lines 20 days prior to site mobilization to assess owl presence and need for further mitigation. All survey results shall be submitted to the CDFG. If owls are present, and nesting is not occurring, owls are to be removed per CDFG-approved passive relocation. Passive relocation is recommended from September 1 to January 31, to avoid disruption of breeding activities. If owls are nesting, nest(s) should be avoided from February 1 through August 31 by a minimum of a 250-foot buffer or until fledging has occurred. Following fledging, owls may be passively relocated.

If burrowing owls are found on the site or along the transmission lines, on-site or off-site compensation for losses will be required, whichever is feasible. CDFG recommends 6.5 acres of protected lands for each pair of owls or unpaired resident bird. Foraging habitat should be replaced at 0.5:1 (mitigation:impacts). Existing unsuitable burrows on the protected lands should

be enhanced (e.g., cleared of debris or enlarged) or new burrows installed at a ratio of 2:1. If off-site compensation is the only option, the mitigation ratios will increase depending on the distance from the site and burrowing presence on or near the mitigation parcel.

Verification: At least 15 days prior to the expected start of any project-related ground disturbance activities, the project owner shall provide the CPM and CDFG with the burrowing owl survey results and identify any lands proposed for mitigation (if applicable). The land purchase shall be approved by the CPM and reviewed by CDFG. All mitigation measures and their implementation methods shall be included in the BRMIMP.

Emergency Management to Avoid Harassment or Harm

BIO-20 The project owner shall prepare an agency notification list for emergency events which involve the rupture or spill of brine fluids at the facility. The project owner shall obtain and then follow the recommendations resulting from the agency notification for avoiding harassment or harm to biological resources.

Verification: The project owner shall provide the specified document at least 60 days prior to start operations.

The CPM, in consultation with the CDFG, the USFWS (both refuge managers and division staff) and any other appropriate agencies, will determine the acceptability of the plan within 45 days of receipt.

County Permit for Wellheads, Pads and Brine Pipelines

BIO-21 The project owner shall provide final copies of the County permit conditions for the wellheads, pads and brine pipelines. The biological resource related terms and conditions contained in the permit shall be incorporated in the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the permit.

Compensation for Impacts to Flat-tailed Horned Lizard Habitat

BIO-22 The project owner shall provide funding to the Bureau of Land Management (BLM) for impacts to flat-tailed horned lizard as prescribed by the *Flat-tailed Horned Lizard Rangeland Management Strategy - Appendix 4 Compensation Formula*.

Verification: At least 30 days prior to the start of any transmission line mobilization activities, the project owner shall submit to the CPM proof of payment to the BLM.

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CULTURAL RESOURCES

Roger Mason and Gary Reinoehl

INTRODUCTION

In this cultural resources section staff identified potential impacts of the proposed Salton Sea Unit #6 Project (SSU6) on cultural resources, as defined under state and federal law. The primary concern in cultural resources analysis for this project is to ensure that all potential impacts are identified and that conditions are set forth that ensure that impacts are mitigated below a level of significance under the California Environmental Quality Act.

Staff completed cultural overview of the project, as well as analyses of potential impacts from the project using criteria from the California Environmental Quality Act (CEQA) and the National Historic Preservation Act. If cultural resources are identified, staff determines whether there may be a project related impact to identified resources and if the resource is eligible for the California Register of Historic Resources (CRHR) or the National Register of Historic Places (NRHP). If the resources are eligible for either register, staff recommends mitigation that attempt to ensure that no significant impacts would occur and that would reduce impacts to the cultural resource to a less than significant level, if possible.

There is always a potential that a project may impact a previously unidentified resource or may impact an identified historical resource in an unanticipated manner. Staff therefore recommends procedures in the conditions of certification that mitigate these potential impacts.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following laws, ordinances, regulations, standards, and policies apply to the protection of cultural resources in California. Projects licensed by the Energy Commission are reviewed to ensure compliance with these LORS.

FEDERAL

- Code of Federal Regulations, 36 CFR Part 61. Federal Guidelines for Historic Preservation Projects: The U.S. Secretary of the Interior has published a set of Standards and Guidelines for Archaeology and Historic Preservation. These are considered to be the appropriate professional methods and techniques for the preservation of archaeological and historic properties. The Secretary's standards and guidelines are used by federal agencies, such as the Forest Service, the Bureau of Land Management, and the National Park Service. The State Historic Preservation Office refers to these standards in its requirements for mitigation of impacts to cultural resources on public lands in California.
- Code of Federal Regulations, 36 CFR Part 800 et seq., the implementing regulations of Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470 requires federal agencies to take into account the effects of their undertakings on historic properties through consultations beginning at the early stages of project planning.

The regulations implementing this act, which were revised in 1997, set forth procedures to be followed for determining eligibility of cultural resources, determining the effect of the undertaking on the historic properties, and how the effect would be taken into account. The eligibility criteria and the process described in these regulations are used by federal agencies. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the California Register of Historical Resources.

STATE

- California Code of Regulations, Title 14, section 4852 defines the term "cultural resource" to include buildings, sites, structures, objects, and historic districts.
- Public Resources Code, Section 5000 establishes the California Register of Historic Places (CRHR), establishes criteria for eligibility to the CRHR, and defines eligible resources. It identifies any unauthorized removal or destruction of historic resources on sites located on public land as a misdemeanor. It also prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and establishes the penalty for possession of such artifacts with intent to sell or vandalize them as a felony. This section defines procedures for the notification of discovery of Native American artifacts or remains, and states that it is the policy of the State that Native American remains and associated grave artifacts shall be repatriated.
- The California Environmental Quality Act (CEQA) (Public Resources Code, section 21000 et seq.; Title 14, California Code of Regulations, section 15000 et seq.) requires state agencies to analyze potential environmental impacts of proposed projects and requires application of feasible mitigation measures and consideration of alternatives.
- Public Resources Code section 21083.2 states that the lead agency determines whether a project may have a significant effect on "unique" archaeological resources; if so, an Environmental Impact Report (EIR) shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, the lead agency may require reasonable steps to preserve the resource in place. Otherwise, mitigation measures shall be required as prescribed in this section. The section discusses excavation as mitigation; limits the Applicant's cost of mitigation; sets time frames for excavation; defines "unique and non-unique archaeological resources;" and provides for mitigation of unexpected resources. [The California Energy Commission process is a CEQA equivalent process and Staff Assessments replace the CEQA environmental documents.]
- Public Resources Code section 21084.1 indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historic resource. The section further defines a "historic resource" and describes what constitutes a "significant" historic resource.
- CEQA Guidelines, Title 14, California Code of Regulations, section 15126.4(b), prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and discusses

- mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.
- CEQA Guidelines, section 15064.5 defines the term “historical resources,” explains when a project may have a significant effect on historic resources, describes CEQA’s applicability to archaeological sites, and specifies the relationship between “historical resources” and “unique archaeological resources.”
- Penal Code, section 622 1/2 states that anyone who willfully damages an object or thing of archaeological or historic interest is guilty of a misdemeanor.
- California Health and Safety Code, section 7050.5 states that if human remains are discovered during construction, the project owner is required to contact the county coroner.

LOCAL

Imperial County

The Imperial County General Plan Land Use Element includes the following goal (Goal 9): “Identify and preserve significant natural, cultural, and community character resources and the County’s air and water quality.” More specifically, Objective 9.1 states: “Preserve as open space those lands containing watersheds, aquifer, recharge areas, floodplains, important natural resources, sensitive vegetation, wildlife habitats, historic and prehistoric sites, or lands which are subject to seismic hazards and establish compatible minimum lot sizes.” The Imperial County Planning Department is responsible for implementing this objective, as well as ensuring that projects it regulates through the permitting process comply with the provisions of CEQA.

ENVIRONMENTAL SETTING

The SSU6 plant site, well pads, and associated linear routes for water and brine pipelines and transmission lines are located at the south end of the Salton Sea in Imperial County. The area is almost entirely agricultural, except for the existing geothermal energy facilities and the nearby communities of Niland, Calipatria, and Westmorland. There is almost no topographic relief, except for some gently rising terrain at the west end of the L-Line Transmission Line Interconnection route and the east end of the Imperial Irrigation District (IID) Midway Transmission Line Connector route. The project area is within the Salton Trough which has elevations between 6 and 80 meters below sea level. Most of the project area is about 70 meters (200 feet) below sea level, although the IID Midway Transmission Line Connector route rises to 90 feet below sea level at its eastern end. The transmission line routes follow paved and unpaved road alignments, except for the west end of the L-Line Transmission Line Interconnection route which crosses undeveloped desert lands administered by the Bureau of Land Management. The project area is crossed by numerous irrigation canals and drains which bring irrigation water from the Colorado River and empty it into the Salton Sea (CEOE 2002d: 2-1).

The project area is in the Colorado Desert environmental zone that is bordered on the west by the Peninsular Range and on the north by the higher elevation Mojave Desert. The Colorado Desert extends east across the Colorado River into southern Arizona and northern Mexico. The Salton Trough portion of the Colorado Desert is about 80 miles long and 30 miles wide. At various times during the Holocene (the 10,000 year period after the end of last ice age) the trough filled with waters from the Colorado River forming Lake Cahuilla (the prehistoric equivalent of the Salton Sea). At other times, the trough was dry. Prehistoric occupation of the trough area appears to have coincided with long term stable stands of Lake Cahuilla at the beginning and end of the Holocene. The Colorado Desert is characterized by low rainfall, low humidity, and hot summer temperatures. Native plants include members of the goosefoot family, creosote bush, mesquite, saltbush, and cactus. Animals consisted of jackrabbit, bobcat, coyote, rodents, birds, and reptiles (CEOE 2002d:2-1).

The Salton Trough is the landward extension of the Gulf of California Tectonic Zone where the continental crust is being rifted by the Pacific Plate along the San Andreas Fault. Five rhyolite domes along the south edge of the Salton Sea are the result of relatively recent magma eruptions up through the much older sedimentary rocks in the trough (CEOE 2002d:2-1). One of these domes is Obsidian Butte, which served as a source of obsidian for the prehistoric inhabitants of the area when Obsidian Butte was not covered by the waters of Lake Cahuilla. Obsidian from Obsidian Butte was distributed through trade throughout southern California during the Late Prehistoric Period (Ericson et al. 1989).

Refer to the **PROJECT DESCRIPTION** section of this Preliminary Staff Assessment for additional information and maps of the project development region and the project area.

PREHISTORIC SETTING

The San Dieguito Complex (a group of artifacts and subsistence remains that are characteristic of a specific period of time and geographic area) was originally thought to represent Early Holocene (12,000 to 8,000 BP [years before present, computed from 1950]) big game hunters who lived around the pluvial lakes in the Great Basin and Colorado Desert (Warren 1967). More recent research indicates these people were likely highly mobile hunter-gatherers who exploited a wider range of animal and plant foods. The San Dieguito Complex is represented in the archaeological record entirely by lithic technology (stone tools) which consists of well-made projectile points, bifacial blades and knives, scrapers, scraper planes, and choppers. San Dieguito sites consist of lithic scatters, rock features, cleared circles, and trails and are usually found on terraces overlooking drainages and along the shorelines of the former pluvial lakes such as Lake Cahuilla (CEOE 2002d:2-3).

Only a small amount of archaeological material is known from the Salton Trough for the long period between about 8,000 BP and about 900 BP or about AD 1050. The only radiocarbon dates from archaeological sites during this period are from 5,000 to 6,000 BP and from circa 1500 BP. The sparse occupation during the middle Holocene may be related to extremely arid climatic conditions and fluctuations in the level of Lake Cahuilla.

A major population increase coincided with a more stable water level of Lake Cahuilla between about 900 and 500 BP and is known as the Yuman II period. The Yuman II period is characterized by the use of ceramics, cremation of the dead, circular domed brush walled structures, and shell ornaments from both the Gulf of California and the Pacific coast. The Yuman III period from 500 BP to Spanish contact is characterized by a smaller population and more restricted area of occupation as Lake Cahuilla contracted and expanded and finally disappeared. The Yuman III period is characterized by dispersed seasonal settlements and trail systems. An archaeological study of the McCain Valley showed that a seasonal round existed that took people from the desert floor in the spring to Mount Laguna in the Peninsular Range for the acorn harvest in the fall. Winters were spent in sheltered canyons (Cook and Fulmer 1980).

ETHNOGRAPHIC BACKGROUND

The study area was within the territory used by the Ipai-Tipai, also known as the Diegueño and the Kumeyaay (Kroeber 1925; Luomala 1978). The Ipai-Tipai language is Diegueño and belongs to the Yuman language family of the Hokan stock. The Ipai-Tipai occupied the coast from the San Luis River south and their territory extended inland from the coast across the Peninsular Range to the Salton Trough (CEOE 2002d:2-4). The eastern boundary was the Chocolate Mountains and sand hills between the Salton Trough and the Colorado River.

Most Ipai-Tipai settlements were campsites occupied during the seasonal round. Bands usually spent the winter together and dispersed in the spring. Winter villages were located in sheltered areas at lower elevations. Most shelters were dome shaped or gable shaped with a pole framework covered with thatch or earth. Windbreaks were used during the summer. Caves and bark-roofed slab huts were used in the mountains. Acorns harvested in the mountains in the fall were a major food source. Other important plants were agave, yucca, cactus fruits, grass seeds, and mesquite pods. Deer, rabbits, rodents, and birds supplemented the diet. Inland groups traded acorns, agave, mesquite and gourds for salt, dried fish and shellfish, and abalone shells from the coast (CEOE 2002d:2-5).

HISTORIC SETTING

Spanish missionaries began their exploration of California and development of the missions in 1769, starting in San Diego and ending with the missions in San Rafael and Sonoma established in 1823. Mission San Diego was the first mission, founded in 1769. The San Diego Mission later established an *asistencia*, or mission outpost, at Santa Isabel in the Peninsular Range. In 1779, 1,500 Ipai-Tipai lived near the San Diego Mission and in 1821 450 lived near the Santa Ysabel *asistencia*. The Spanish did not establish any permanent outposts in the Imperial Valley. The earliest Spanish exploration of this area occurred in 1774 when Juan Bautista de Anza led an expedition across the Anza Borrego Desert to the California coast to find an overland route to the missions. The next year Anza guided a group of 240 colonists and soldiers from Sonora along this route and founded the Spanish settlement at San Francisco (CEOE 2002d:2-6).

After Mexico became independent from Spain in the early 1830s, the Mexican government closed the missions. Former mission lands were granted to soldiers and

other Mexican citizens for use as cattle ranches. However, no Mexican land grants were made in the arid Imperial Valley.

Alta California became part of the United States in 1848 as a result of the Treaty of Guadalupe Hidalgo between Mexico and the United States. Although major intercontinental transportation routes from Los Angeles to the east via Yuma passed through the Imperial Valley (the Butterfield Stage Route along the western side of the valley from 1858 to 1861 and the Southern Pacific Railroad along the east side after 1878), the valley remained unsettled during the American Period until a system of irrigation canals was completed to provide water for agriculture in the early twentieth century.

In the 1890s a civil engineer named C. R. Rockwood and George Chaffey, who had previously constructed successful irrigation systems in the Ontario area of San Bernardino County and in Australia, began planning and financing an irrigation system for the Imperial Valley using Colorado River water. The two men formed the California Development Company and the Imperial Land Company which were financed by investors. These companies bought land and built irrigation canals. Water was diverted from the Colorado River into the canal system in 1901 and by the end of the year, 1,500 acres were under cultivation around Calexico. As more canals were built, the population increased rising to 12,000 by 1905 (CEOE 2002d:2-7).

The canals soon became full of silt that caused people to open the canals at their lower ends to provide drainage. The combination of the canal openings and a series of Colorado River floods in 1904 and 1905 resulted in a major flow of Colorado River water through the Imperial Valley. By the time the flow was stopped in February 1907, the Salton Sea had been formed. As a result of the floods, 13,000 acres of formerly cultivated land were unusable (CEOE 2002d:2-7).

After the dissolution of the California Development Company in 1909 as a result of financial losses due to the floods, there was no valley-wide organization to finance and develop the irrigation system. Thirteen small water companies existed until 1921 when the valley-wide Imperial Irrigation District was formed. New arrivals during the 1910s purchased land in one of the 13 water districts and extensively altered and leveled the land so that water from the canals would efficiently irrigate their land. The principal agricultural activities during this period were growing alfalfa, raising hogs, and dairying. A series of small towns developed north of Calexico during this period to supply the needs of the newly-arrived farmers. These included Brawley (1908), Westmorland (1910), Niland (1913), and Calipatria (1914) (CEOE 2002d:2-8).

The problem of soil salinity, caused by salts in the irrigation water which remained in the soil as the water evaporated, was solved when the Imperial Irrigation District finished a system of canals that drained water from fields into the Salton Sea in 1929. Risk and uncertainty were further reduced when the Hoover Dam and the All American Canal were completed in the 1930s. The Hoover Dam prevented any further flooding from the Colorado River and the All American Canal, constructed between 1933 and 1938 and opened in 1940, rerouted Colorado River water from an earlier route through Mexico to a route entirely within the United States (Nilsson et al. 2002:2-8). These improvements resulted in a second wave of settlement in the 1930s and 1940s. Many of the

farmsteads in the project area were begun at this time. Many more crops were also introduced at this time and included cantaloupes, citrus, grapes, wheat, beets, asparagus, and cotton. Currently, 3,000 miles of irrigation and drainage canals serve 500,000 acres of cultivated land, yielding nearly \$1 billion in agricultural products (CEOE 2002d:2-8).

RESOURCES INVENTORY

Literature and Records Search

Prior to preparation of the AFC, CE Obsidian Energy, LLC (CEOE) conducted a cultural resources literature search and reviewed site records and maps for the project area at the Southeast Information Center of the California Historic Resources Information System (CHRIS) located at the Imperial Valley College Desert Museum. The record search included an area extending for one mile around the Unit 6 site and the project linear routes. CEOE also contacted representatives of the Imperial Valley Historical Society and the San Diego Historical Society to identify historical resources in the project area (CEOE 2002d:2-8 to 2-9). CEOE determined that the Imperial County Planning Department does not maintain an inventory of historical resources (CEOE 2002l, Data Response 45).

As a result of the record search, 83 previously recorded sites and 18 isolated prehistoric artifacts were identified as being located between 200 and 1200 meters of the project site and associated linear routes. Of the 83 sites, 75 were prehistoric, seven were historic, and one was prehistoric and historic.

No previously recorded cultural resources are located on the parcel proposed for the SSU6. Previously recorded cultural resources located within 100 feet of the project linear routes, including the alternate L-Line interconnection, consist of four prehistoric artifact scatters (CA-IMP-4931, CA-IMP-7804, CA-IMP-6415, and CA-IMP-6416), four trail segments (CA-IMP-900, CA-IMP-902, CA-IMP-903, and CA-IMP-5108) recorded on an 1859 survey carried out by the United States Geological Survey, one historic canal (CA-IMP-7834; P-13-008303), and one prehistoric isolated artifact (IMP-6436-I). Two of the artifact scatters (CA-IMP-4931, CA-IMP-7804) and all four trail segments are located along the L-Line Interconnection route. The L-Line Interconnection route and the alternate L-Line Interconnection route cross the historic Westside Main Canal. The other two artifact scatters, and the isolate are located along the alternate L-Line Interconnection route which runs parallel to this historic canal. No previously recorded cultural resources are located along the IID Midway Interconnection route.

Field Surveys

CEOE performed an intensive pedestrian archaeological survey of the property proposed for the SSU6 and the associated linear routes in January 2002. The survey of the power plant property was performed by walking parallel 15 meter transects. An area 100 feet wide on each side of the centerline of the linear routes was surveyed (CEOE 2002d:2-8 to 2-9). No cultural resources were identified as a result of the survey of the SSU6 parcel.

The survey of the L-Line Interconnection route showed that no physical traces of the four trails indicated on the 1859 map remain and could not be relocated within the

impact area of the project. The two previously recorded lithic scatters along the L-Line Interconnection route were relocated. In 1982, when originally recorded, CA-IMP-4931 consisted of a lithic and ceramic scatter. During the current survey, only three pieces of debitage were observed at the recorded site location. In 2000, when originally recorded, CA-IMP-7804 (also known as P-13-008303) consisted of sherds, debitage, and other materials. During the current survey, a more diffuse scatter of similar artifacts was noted (CEOE 2002d:5-3).

Three new prehistoric sites (designated BB-1, BB-2, and KH-1) were recorded. BB-1 is a small diffuse scatter of debitage with both obsidian and metavolcanic flakes. The site area has been disturbed by erosion from an alluvial wash and by modern earth moving activities. BB-2 is also a diffuse lithic scatter. The site area has been disturbed by erosion from an alluvial wash. KH-1 consists of a scatter of debitage and other materials (CEOE 2002d:5-3).

The Westside Main Canal (CA-IMP-7834; P-13-008334) crosses the L-Line Interconnection route and parallels the alternate L-Line Interconnection. This segment is a concrete lined irrigation canal constructed between 1941 and 1950 that was incorporated into the All American Canal system (CEOE 2002l, Data Response 38). CEOE provided background information on the history of the canal and previous segments of the canal that have been evaluated including one completed by Jill Hupp with Caltrans.

The two lithic scatters (CA-IMP-6415, and CA-IMP-6416) along the alternate L-Line Interconnection could not be relocated during the survey.

No archaeological sites were identified during the survey of the IID Midway Interconnection route. One isolated artifact, a primary chert flake was recorded along this route. A feature from the historic period, a portion of the J Lateral Water Conveyance System, consisting of two concrete culverts, was also recorded. Some sections of the culvert are stamped with the date 1949 while other newer sections bear the date 1982.

Well Pad OB-3 is proposed for Obsidian Butte, the source obsidian that was used by prehistoric people to make flaked stone tools throughout southern California during the latter part of the Late Prehistoric period (Ericson et al. 1989). However, according to CEOE, Obsidian Butte has not been recorded as an archaeological site. During a visit to Obsidian Butte, CEOE showed staff the proposed location of Well Pad OB-3. Well Pad OB-3 would be built in a portion of the Obsidian Butte area that has already been graded by the Imperial Irrigation District, which owns Obsidian Butte. However, it appears that the route of the pipeline that would connect OB-3 to the power plant has not yet been determined. The pipeline route may cross undisturbed portions of the Obsidian Butte area.

CEOE recorded and evaluated four structures from the historic period along the L-Line Interconnection route and recorded and evaluated two structures from the historic period along the IID Midway Interconnection route. At the request of staff, an inventory and evaluation of additional buildings and structures from the historic period was conducted by CEOE. The 15 evaluated properties are identified in Table 1. Most

properties consist of farmstead/ranch structures. Construction dates for the buildings range from the 1920s to the present (CEOE 2002d, CEOE 2003c, Supplemental Data Responses 31-38).

Table 1.
Historical Structures Evaluated for the SSU6 Power Plant Project

| Address | Description | Location | Date of Construction | Appears Eligible | Appears Not Eligible |
|--|----------------------------------|----------------------------------|------------------------------------|------------------------------------|-----------------------------|
| 5897 Lack Road | Farmstead | L-Line Interconnection | 1940s | | X |
| 5905 Lack Road | Farmstead | L-Line Interconnection | 1920s | | X |
| 6005 Lack Road | Farmstead | L-Line Interconnection | 1945-1956 | | X |
| Lack Road / Bowles Road | Vail Ranch Headquarters | L-Line Interconnection | 1950s-1960s (extant structures) | Potentially Criterion 2 CRHR | |
| 1804 Bannister Road | Farmstead | L-Line Interconnection | 1940s | | X |
| 5697 Lack Road | Farmstead | L-Line Interconnection | 1945-1956 | | X |
| 5404 Pellet Road | Farmstead | L-Line Interconnection | 1945-1956 | | X |
| 1996 Bannister Road | Farmstead | L-Line Interconnection | 1945-1956 | | X |
| Bridge #58C0101 Lack Road over New River | Timber Trestle Bridge | | Unknown | | X |
| 1205 Hooper Road or 1205 A & B Hooper Rd. | Farmstead | IID Midway Interconnection | ca. 1945 | | X |
| Southern Pacific Railroad – Niland Branch Line | Railroad | IID Midway Interconnection | 1903 | | X |
| 5908 Poe Road | Shed | Alternate L-Line Interconnection | after 1956 | | X |
| Intersection Howenstein Road and SR 86 | Farmstead | Alternate L-Line Interconnection | 1956-present | | X |
| 3104 SR 86 | Elmore Desert Ranch Headquarters | Alternate L-Line Interconnection | 1956-present | | X |
| Intersection of Barth Road and SR 86 | Abandoned Farmstead | Alternate L-Line Interconnection | 1945-1956 | | X |

Native American Contacts

CEOE contacted the Native American Heritage Commission (NAHC) on February 1, 2002 to obtain a list of Native Americans to be contacted for the project area. The NAHC provided names of contacts for Imperial and San Diego Counties. On February 27, 2002, CEOE sent letters to these individuals which described the project and asked about concerns. No responses were received. CEOE did not request that the NAHC search its Sacred Lands File (CEOE 2002d:letters in Appendix E).

CATEGORIZATION OF IDENTIFIED CULTURAL RESOURCES

Various laws apply to the treatment of cultural resources. These laws require the Energy Commission to categorize cultural resources by determining whether they meet sets of specified criteria. These categories then in turn influence the analysis of potential impacts to the cultural resources and the methods and consultation required to mitigate any such impacts. Federal laws apply when a federal agency takes an action. The federal agency would comply with the applicable federal laws. The preferred alignment of the L-Line Interconnection crosses Bureau of Land Management (BLM) property. This would require an approval action by this federal agency. The federal agency is responsible for compliance with federal regulations.

Under federal law, only historical or prehistoric sites, objects, or features, or architectural resources that are assessed as “significant” in accordance with federal guidelines need to be considered in analyzing potential impacts. The significance of historical and prehistoric cultural resources is based on the criteria for eligibility for nomination to the NRHP as defined in Title 36 Code of Federal Regulations, section 60.4. If such resources are determined to be significant, and therefore eligible for listing in the NRHP they are afforded certain treatment under the National Historic Preservation Act. If the resources are determined significant, and therefore eligible for the CRHR, then mitigation measures are implemented under CEQA to reduce the impact to less than significant if possible. Federal agencies are responsible for meeting the requirements of NHPA and the Energy Commission is responsible for meeting the requirements of CEQA.

The National Register criteria state that “eligible historic properties” are: districts, sites, building, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that:

- a) are associated with events that have made a significant contribution to the broad patterns of our history; or
- b) that are associated with the lives of persons significant in our past; or
- c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- d) that have yielded, or may be likely to yield, information important to history or prehistory. Isolated finds by definition do not meet these criteria.

California has adopted a very similar set of criteria for assessing resources for the California Register of Historical Resources.

Under federal law, cultural resources determined not to be significant, that is, not eligible for National Register listing, are subject to recording and documentation only, and are afforded no further treatment. However, occasionally certain resources, although they may not be assessed as “significant,” may nonetheless be of local or regional importance such that mitigation may be warranted regardless of their assessed significance. Energy Commission staff and involved federal agencies evaluate the

survey reports and site records for any known resources located within or adjacent to the project Area of Potential Effects (APE) to determine whether they meet the eligibility criteria.

The record and literature search and the pedestrian surveys of the proposed project area and linears were conducted to identify the presence of any cultural resource sites or materials. Where cultural resources were identified, additional evaluation was conducted to determine whether the resources are already listed on, or are potentially eligible for listing on, either the NRHP or the CRHR. The determination of eligibility is made in compliance with the applicable provisions of the National Historic Preservation Act.

CEQA Guidelines explicitly require the lead agency (in this case, the Energy Commission) to make a determination of whether a proposed project would affect “historical resources.” The guidelines provide a definition for historical resources and set forth a listing of criteria for making this determination. These criteria are the eligibility criteria for the CRHR and are essentially the same as the eligibility criteria for the NRHP. In addition, as with the NRHP, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Resources eligible for the CRHR may have less integrity than the resources eligible for the NRHP. If the criteria are met and the resource is determined eligible for the CRHR, the Energy Commission must evaluate whether the project would cause a “substantial adverse change in the significance of the historical resource,” which the regulation defines as a significant effect on the environment.

CEQA also contains a section addressing “unique” archeological resources and provides a definition of such resources (Public Resources Code, Section 21083.2). This section establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archeological resources that are not unique. However, the CEQA Guidelines state that the limitations in this section do not apply when an archeological resource has already met the definition of an historical resource (Title 14, California Code of Regulations, Section 15064.5).

CEOE’s architectural historian has evaluated 15 resources that are more than 45 years old that are within 100 feet of a transmission line route or that are visible from the power plant site. CEOE recommended that none of these resources are eligible for the California Register of Historical Resources (CRHR). Staff agrees that 14 of these resources do not meet the criteria for eligibility of the CRHR (Table 1). One resource, the Vail Ranch is potentially eligible for the California Register of Historical Resources under criterion 2 (CEOE 2002d). The eligibility of this resource is still being considered.

Staff had also requested that the resources located at the north end of Crummer Road (interconnection line segment L-1 and L-2, Figure 2)(CEC 2002c, Data Request 31d), east of the proposed plant site along Gentry Road (CEC 2002c, Data Request 31e), Calipatria State Prison along the IID Midway Interconnection route (CEC 2002c, Data Request 31g), structures along the IID Midway Interconnection route near its intersection with the Union Pacific Railroad (CEC 2002c, Data Request 31f), and structures east of State Route 86 and south of the north boundary of Section 4, along the Alternative L-Line Interconnection route (CEC 2002c, Data Request 31i) be

evaluated, if they were determined to be greater than 45 years old. However, the Data Response contained no forms providing such evaluations (CEOE 2003c, Supplemental Data Responses 31-38). Staff has requested documentation that the buildings and structures are less than 45 years of age or the evaluation of the resource. The age of the resources or evaluation of the resource and impact assessment will be provided in the Final Staff Assessment.

CEOE has indicated that the California Department of Corrections web page states that the Calipatria State Prison was opened in 1992. Staff reviewed USGS Quadrangle maps produced in 1954 and 1992 revealing that the Calipatria State Prison was not in existence in 1954, providing further documentation that the prison is less than 45 years of age.

It is not yet known whether the five prehistoric archaeological sites, two relocated and the three newly found, (CA-IMP-4931, CA-IMP-7804, BB-1, BB-2, and KH-1) along the L-Line Interconnection route are eligible for the NRHP or the CRHR. CEOE has not yet performed archaeological test programs at these sites in order to evaluate their eligibility. The eligibility of the resources shall be determined and the impacts assessed for the Final Staff Assessment.

A segment of the Westside Main Canal, built between 1901 and 1907, outside the project area, has been evaluated by Caltrans as not eligible for the CRHR because of a lack of integrity. In the DPR 523 form for the Westside Main Canal provided by CEOE, Hupp states in her evaluation of a segment of the Westside Main Canal that. "Caltrans architectural historian Frank Lortie, after an extensive study of the IID system in 1997, concluded that the elements in the IID that retain integrity for the period 1941-1950 could be contributors to a potentially eligible National Register Historic District." Hupp continues noting that in 1997 and 1998, several segments of the Westside Main Canal were "...found ineligible due to loss of integrity." She found the segment within the project area of potential impact to not meet the requirements to contribute to the eligibility of the potential district (CEOE 2002d). Hupp only evaluated the segment of the resource within the impact area of the Caltrans project not the entire resource (personal communication, 3/13/03).

CEOE states that this section of the Westside Main Canal has been extensively altered as a result of reconstruction and dredging activities and the addition of a concrete lining. The segment of the Canal in the project area was constructed between 1941 and 1950, and has been subject to some of the same alterations. CEOE concludes that this segment is not eligible because of a lack of integrity (CEOE 2002l, Data Response 38).

The portion of the canal illustrated on the DPR 523 form show a concrete lining in a "V" configuration. This is different than the description of the alterations that were undertaken in the 1960s, making a more "U" shaped canal. Staff has requested specific information on the changes in the aspects of integrity for this resource. The change from an earthen canal to a concrete lined canal is of particular importance to this section of canal in terms of its eligibility and whether this segment could contribute to the potential historic district. If the lining was changed within the period of significance (1941-1950), changes in integrity are much less than if the lining was added after the period of significance. Since the proposed project's major impact to the canal is an

alteration of the setting, an assessment of the importance of the setting to the eligibility of the resource may be sufficient to determine if the project could materially impair the eligibility of the resource. This will be addressed in the Final Staff Assessment.

Obsidian Butte has not yet been formally evaluated for the CRHR. This area is noted as the highest sensitivity for cultural resources in the Salton Sea Anomaly Master Environmental Impact Report and Magma Power Plant #3(49 MW) Environmental Impact Report Draft. Although a portion of the Butte has lost integrity as a result of sand and gravel mining operations by the Imperial Irrigation District, intact portions remain and it is possible that Obsidian Butte is potentially eligible for the CRHR for information values and traditional cultural values. The potential eligibility of Obsidian Butte has yet to be resolved.

ANALYSIS AND IMPACTS

Since project development and construction entail surface and subsurface disturbance, the proposed Salton Sea Unit 6 Power Plant Project has the potential to adversely affect both known and unknown cultural resources. Staff has analyzed the potential direct, indirect, and cumulative impacts from the proposed project. Direct impacts are those which may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation or demolition. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or vandalism due to improved accessibility. Cumulative impacts to cultural resources may occur if increasing amounts of land are cleared and disturbed for the development of multiple projects in the same vicinity as the proposed project.

The potential for the project to cause impacts to cultural resources is related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Although the existence of known cultural resources increases the potential for additional resources, the absence of known resources does not necessarily mean that unknown resources would not be encountered and that impacts would therefore not occur.

PROJECT RELATED IMPACTS

The inventories for the linear components recorded five prehistoric archaeological sites. Since these sites have not yet been evaluated for eligibility for the CRHR, staff cannot determine whether impacts to these sites would be significant. Only impacts to eligible sites can be potentially significant. CEOE needs to provide the results of test excavations of these five sites and determine whether the sites are eligible for the National Register of Historic Places or the California register of Historical Resources. Once the eligibility is determined, then the impact to the sites and any required mitigation measures to reduce the impacts to less than significant can be determined. This information is necessary prior to the Final Staff Assessment so the analysis can reflect the evaluation of the resources, the assessment of impacts, and any required mitigation measures.

Similarly, Obsidian Butte has not been formally evaluated for the CRHR (information values and traditional cultural values) nor has the route of the pipeline connecting well pad OB-3 at Obsidian Butte to the power plant been defined. Thus, staff cannot determine whether potentially significant impacts to Obsidian Butte could occur. A complete record of the resource at Obsidian Butte needs to be prepared, clearly identifying the elements of the resource that might be within a corridor for the pipeline or impacted by the well and pipeline construction. A determination of whether the resource meets the eligibility requirements of the CRHR needs to be made. Contacts with Native Americans need to be made to determine whether Obsidian Butte could qualify as a traditional cultural resource and if the construction of the power plant, well pad OB-3 and the associated pipeline would impact such a resource.

CEOE stated that site records of the resources at Obsidian Butte would be submitted to the Energy Commission within a few weeks. A thorough recording of the site has not been conducted. Information regarding the value of this resource as a traditional cultural resource still needs to be gathered. This must be completed for the analysis to be complete in the Final Staff Assessment.

It is unknown whether there would be significant impacts to historical structures and infrastructure because resources in three areas (near the intersection of Il Midway Interconnection and the Union Pacific Railroad, east of State Route 86 and south of the north boundary of Section 4, at the north end of Crummer Road (interconnection line segment L-1 and L-2, Figure 2), and east of the proposed plant site along Gentry Road and near the intersection of Lack Road and Bowles Road [Vail Ranch Headquarters]) in the project remain to be evaluated. Staff has requested documentation that the buildings and structures are less than 45 years of age or that a record and evaluation of the resource be completed. The age of the resources or evaluation of the resource and impact assessment will be provided in the Final Staff Assessment.

Staff has requested additional information on the Vail Ranch and the Westside Main Canal. This information must be available to staff to complete the analysis for the Final Staff Assessment.

CUMULATIVE IMPACTS

Because the impacts to cultural resources as a result of the Salton Sea Unit 6 Power Plant project have not been fully determined, the cumulative impacts can not be concluded to this resource category. Cumulative impacts to archaeological resources cannot be determined until the archaeological resources identified in the project area have been evaluated and impacts to any eligible archaeological resources have been analyzed.

IMPACTS OF FACILITY CLOSURE

The anticipated lifetime of the Salton Sea Unit 6 Power Plant Project is approximately 30 years. Upgrades or modifications made prior to the facility's closure might extend the life of the plant. Closure would be caused by either (1) a natural or manmade disaster or economic difficulty, or (2) planned orderly closure that would occur when the plant becomes economically non-competitive.

At the time of planned closure, all then-applicable LORS would be identified and the closure plan required by the Energy Commission would address compliance with these LORS. Generally, if no additional ground disturbance occurs during closure activities and all conditions of certification have been met, no impacts to cultural resources would be expected. However, actual potential impacts are likely to depend upon the final location of project structures in relation to existing resources, and upon the procedures used for the removal of project structures. Since the spatial relationship between the closure and removal of project structures and sensitive resources cannot be determined at this time, no conclusion can be drawn at this time with respect to the impact of facility closure on cultural resources. The closure plan, when created, would address impacts to cultural resources.

A temporary closure should have no impacts on cultural resources as long as no additional lands are needed for the closure. A contingency plan for temporary cessation of operation would be implemented that would ensure compliance with all applicable LORS.

If a site were abandoned, impact to cultural resources would be unlikely because there would be no immediate soil disturbances. Over time, depending on the need to disturb the ground to accomplish project closure and facility removal, some disturbance of known and/or previously unknown cultural resources might result.

COMPLIANCE WITH APPLICABLE LORS

Imperial County has policies and goals for the protection of cultural resources, but has no specific procedures for implementation of CEQA that differ from procedures used by the Energy Commission. Implementation of the mitigation measures recommended in the conditions of certification would ensure compliance with state and local LORS.

MITIGATION

For cultural resources, the preferred method of mitigation is for project construction to avoid areas where cultural resources are known to exist, wherever possible. Often however, avoidance cannot be achieved, and other measures such as surface collection, subsurface testing, and data recovery must be implemented for archaeological resources and documentation must be implemented for historical structures. Mitigation measures are developed to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

APPLICANT'S PROPOSED MITIGATION

Archaeological Resources

CEOE recommends preparation of a Cultural Resource Monitoring and Mitigation Plan (CRMMP) and designation of a qualified cultural resources specialist (CRS). CEOE recommends monitoring where deemed appropriate by the CRS. Any archaeological materials discovered during grading would be evaluated by the CRS and a mitigation plan would be implemented if the resource is evaluated as significant.

CEOE recommends a worker education program to ensure that buried archaeological resources are recognized by construction crews. Such a program would include information about the kinds of archaeological material that could be encountered and the procedures to be followed if such material is discovered. Any archaeological materials collected during the construction monitoring and mitigation program would be curated at a qualified curation facility.

Historic Architectural Resources

No mitigation measures for historic architectural resources were recommended by CEOE.

STAFF'S PROPOSED MITIGATION MEASURES

Commission staff concurs with the mitigation measures proposed by CEOE for archaeological resources and agrees that these measures may reduce the impacts to resources identified during construction to less than significant. However, additional mitigation measures for resources may be necessary. If any of the identified sites are evaluated as eligible for the CRHR additional mitigation measures may be necessary. Similarly, if any of the as yet unevaluated historical structures are evaluated as eligible for the CRHR, additional mitigation measures may be necessary. If there is a resource eligible for the CRHR as a traditional cultural resource, mitigation below a level of significance may not be possible.

Staff proposed conditions, based on evaluations completed by CEOE to date, are consistent with CEOE's proposed measures. CEOE's measures are incorporated into staff's proposed Conditions of Certification **CUL-1** through **CUL-7** presented below.

In summary, the conditions require implementation of the following measures. **CUL-1** requires that a qualified cultural resources specialist (CRS) manage cultural resources activities for the project. It also ensures that additional qualified specialists or cultural resources monitors would be retained as needed for the project. To ensure that cultural resources are adequately protected, **CUL-1** requires that the CRS have three years of experience in California. In addition to other relevant types of experience, the condition asserts that the CRS have some background in data recovery.

CUL-2 requires the project owner to provide the CRS with the necessary maps and construction schedule information necessary to schedule monitors and cultural resources activity at the project site. The verification for the condition allows staff to verify that appropriate maps and construction schedule information have been provided to the CRS.

CUL-3 requires that a Cultural Resources Monitoring and Mitigation Plan (CRMMP) is developed that details all required activities that must be completed in order to reduce the impacts to a level that is less than significant. The CRMMP defines the roles and responsibilities of cultural resources personnel and provides timelines for the completion of the required mitigation. The CRS would also obtain Native American monitors to observe work in areas where Native American artifacts are found. The CRMMP requires a discussion of curation specifications, materials to be transferred to a curation facility, and the responsibility of the owner to pay all curation fees.

CUL-4 requires that the project owner provide a Cultural Resources Report (CRR) in Archaeological Resource Management Report (ARMR) format. This report would provide information on all field activities and the findings. The CRR would include all Department of Parks and Recreation (DPR) 523 forms and cultural resource reports not previously provided to the California Historic Resource Information System (CHRIS). Copies of the CRR would be provided to the State Historic Preservation Officer (SHPO), the CHRIS and the curating institution (if archaeological materials were collected).

CUL-5 provides for worker environmental training. The training serves to instruct workers that halting construction is necessary if a potential cultural resource is discovered. It also provides them with instruction regarding applicable laws, penalties and reporting requirements in the event something is discovered. Workers are also instructed that the CRS and other cultural resources personnel have the authority to halt construction in the event of a discovery.

CUL-6 requires notification of staff within 24 hours of a cultural resources find. Timely notification enables staff participation in determinations of significance and the selection of appropriate mitigation to lessen impacts on cultural resources to a level that is less than significant.

It is not possible to determine whether previously undiscovered cultural resources may be potentially significant. It is necessary to discover the cultural resource and assess it in relation to a research design and the criteria that would make a resource eligible to the CRHR or NRHP. In addition, **CUL-6** ensures that unanticipated impacts to cultural resources are identified.

The CRS, alternate CRS and the CRMs have the authority to halt work so that the applicant has flexibility in construction scheduling. The CRS does not have to be at all active areas of construction at the same time. In order to ensure that an impact can be mitigated to less than significant, the individual on site needs to have the ability to stop construction when a discovery is made, not at a later point in time when the CRS has been contacted and informed about the discovery. This condition has been used with these provisions for over four years and has been effective in minimizing impacts to resources.

CUL-7 requires monitoring of the ground disturbance for the project, linears, and ancillary areas and a process for reducing monitoring to a level below full time. It also requires monitoring logs and weekly summaries of the monitoring activities. All non-compliance issues have to be reported to the CPM, and a reporting process is required. Any required Native American monitors should be obtained.

CONCLUSIONS AND RECOMMENDATION

Several resources have not been fully identified and evaluated. Once the evaluation is completed, impacts and mitigation measures will be determined. If there is a resource eligible for the CRHR as a traditional cultural resource, mitigation below a level of

significance may not be possible. The following is needed to complete the analysis, determine impacts, and necessary mitigation measures:

1. Staff has requested the results of test excavations of these five sites (CA-IMP-4931, -7804, BB-1, -2, and KH-1) to determine whether the sites are eligible for the National Register of Historic Places or the California Register of Historical Resources. Once the eligibility is determined, then the impact to the sites and any required mitigation measures to reduce the impacts to less than significant can be determined.
2. A complete record of the resource at Obsidian Butte needs to be prepared, clearly identifying the elements of the resource that might be within a corridor for the pipeline or impacted by the well and pipeline construction. A determination of whether the resource meets the eligibility requirements of the CRHR needs to be made. Contacts with Native Americans need to be made to determine whether Obsidian Butte could qualify as a traditional cultural resource and if the construction of the power plant, well pad OB-3 and the associated pipeline would impact such a resource.
3. Staff has requested documentation that the buildings and structures located 1) near the intersection of II Midway Interconnection and the Union Pacific Railroad and 2) east of State Route 86 and south of the north boundary of Section 4, 3) at the north end of Crummer Road (interconnection line segment L-1 and L-2, Figure 2) and 4) east of the proposed plant site along Gentry Road are less than 45 years of age or that a record and evaluation of the resource be completed. The age of the resources or evaluation of the resource and impact assessment will be provided in the Final Staff Assessment.
4. Additional information has been requested to clearly determine the eligibility of the Vail Ranch and assess the impact of the project. It may be possible to assess the impact of the project assuming eligibility of the resource since changes caused by the project will mainly affect aspects of integrity such as the setting of the resource.
5. Staff has requested specific information on the changes in the aspects of integrity for the Westside Main Canal. The change from an earthen canal to a concrete lined canal is of particular importance to this section of canal in terms of its eligibility and whether this segment could contribute to the potential historic district. If the lining was changed within the period of significance (1941-1950), changes in integrity are much less than if the lining was added after the period of significance. Since the proposed project's major impact to the canal is an alteration of the setting, an assessment of the importance of the setting to the eligibility of the resource may be sufficient to determine if the project could materially impair the eligibility of the resource.

When the above information has been provided, staff will recommend that the Commission adopt the following proposed conditions of certification and additional conditions which incorporate all necessary mitigation measures to reduce the impacts to less than significant, if possible. If the conditions of certification are properly implemented, the project would comply with applicable laws, ordinances, regulations, and standards for cultural resources.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance, the project owner shall obtain the **services** of a **Cultural Resources Specialist (CRS)**, and one or more alternates, if alternates are needed, to manage all monitoring, mitigation and curation activities. The CRS may elect to obtain the services of **Cultural Resource Monitors (CRMs)** and other technical specialists, if needed, to assist in monitoring, mitigation and curation activities. The project owner shall ensure that the CRS evaluates any cultural resources that are newly discovered or that may be affected in an unanticipated manner for eligibility to the California Register of Historic Resources (CRHR). No ground disturbance shall occur prior to CPM approval of the CRS, unless specifically approved by the CPM.

CULTURAL RESOURCES SPECIALIST

The resume for the CRS and alternate(s) shall include information demonstrating that the minimum qualifications specified in the U.S. Secretary of Interior Guidelines, as published in the Code of Federal Regulations, 36 CFR Part 61 are met. In addition, the CRS shall have the following qualifications:

1. The technical specialty of the CRS shall be appropriate to the needs of the project and shall include, a background in anthropology, archaeology, history, architectural history or a related field; and
2. At least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California; and

The resume of the CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS on referenced projects, and demonstrate that the CRS has the appropriate education and experience to accomplish the cultural resource tasks that must be addressed during ground disturbance, grading, construction and operation. In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed CRS or alternate has the appropriate training and background to effectively implement the conditions of certification.

CULTURAL RESOURCES MONITOR

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historic archaeology or a related field and one year experience monitoring in California; or
2. an AS or AA degree in anthropology, archaeology, historic archaeology or a related field and four years experience monitoring in California; or
3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historic archaeology or a related field and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialists, e.g. historic archeologist, historian, architectural historian, physical anthropologist; shall be submitted to the CPM for approval.

Verification: The project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval at least 45 days prior to the start of ground disturbance.

At least 10 days prior to a termination or release of the CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval.

At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resource monitoring required by this condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRM, at least five days prior to the CRM beginning on-site duties. At least 10 days prior to beginning tasks, the resume(s) of any additional technical specialists shall be provided to the CPM for review and approval.

At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions of certification.

CUL-2 Prior to the start of ground disturbance, the project owner shall provide the CRS **and** the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting individual artifacts. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review submittals and in consultation with the CRS approve those that are appropriate for use in cultural resources planning activities.

If construction of the project would proceed in phases, maps and drawings, not previously provided, shall be submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

At a minimum, the CRS shall consult weekly with the project construction manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless specifically approved by the CPM.

1. **Verification:** If there are changes to any project related footprint, revised maps and drawings shall be provided at least 15 days prior to start of ground disturbance for those changes.

If project construction is phased, if not previously provided, the project owner shall submit the subject maps and drawings 15 days prior to each phase.

A current schedule of anticipated project activity shall be provided to the CRS on a weekly basis during ground disturbance and also provided in each Monthly Compliance Report (MCR).

The project owner shall provide written notice of any changes to scheduling of construction phases within five days of identifying the changes.

CUL- 3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by the CRS, to the CPM for approval. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Copies of the CRMMP shall reside with the CRS, alternate CRS, each monitor, and the project owner's on-site manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. A proposed general research design that includes a discussion of research questions and testable hypotheses applicable to the project area. A refined research design will be prepared for any resource where data recovery is required.
2. The following statement shall be added to the Introduction: Any discussion, summary, or paraphrasing of the conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the conditions and their implementation. If there appears to be a discrepancy between the conditions and the way in which they have been summarized, described, or interpreted in the CRMMP, the conditions, as written in the Final Decision, supercede any interpretation of the conditions in the CRMMP. (The Cultural Resources Conditions of Certification are attached as an appendix to this CRMMP.)
3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during ground disturbance, construction, and post-construction analysis phases of the project.
4. Identification of the person(s) expected to perform each of the tasks, their responsibilities; and the reporting relationships between project construction management and the mitigation and monitoring team.
5. A discussion of the inclusion of Native American observers or monitors, the procedures to be used to select them, and their role and responsibilities.
6. A discussion of all avoidance measures (such as flagging or fencing), to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The discussion shall address how these measures would be implemented prior to the start of construction

and how long they would be needed to protect the resources from project-related effects.

7. A discussion of the requirement that all cultural resources encountered shall be recorded on a DPR form 523 and mapped (may include photos). In addition, all archaeological materials collected as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with The State Historical Resources Commission's "Guidelines for the Curation of Archaeological Collections," into a retrievable storage collection in a public repository or museum. The public repository or museum must meet the standards and requirements for the curation of cultural resources set forth at Title 36 of the Federal Code of Regulations, Part 79.
8. A discussion of any requirements, specifications, or funding needed for curation of the materials to be delivered for curation and how requirements, specifications and funding shall be met. If archaeological materials are to be curated, the name and phone number of the contact person at the institution. This shall include information indicating that the project owner will pay all curation fees and state that any agreements concerning curation will be retained and available for audit for the life of the project.
9. A discussion of the availability and the designated specialist's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during construction.
10. A discussion of the proposed Cultural Resource Report (CRR) which shall be prepared according to Archaeological Resource Management Report (ARMR) Guidelines.

Verification: The project owner shall submit the subject CRMMP at least 30 days prior to the start of ground disturbance. Per ARMMP Guidelines the author's name shall appear on the title page of the CRMMP. Ground disturbance activities may not commence until the CRMMP is approved, unless specifically approved by the CPM. A letter shall be provided to the CPM indicating that the project owner would pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall be written by the CRS and shall be provided in the ARMMP format. The CRR shall report on all field activities including dates, times and locations, findings, samplings and analysis. All survey reports, Department of Parks and Recreation (DPR) 523 forms and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

Verification: The project owner shall submit the subject CRR within 90 days after completion of ground disturbance (including landscaping). Within 10 days after CPM approval, the project owner shall provide documentation to the CPM that copies of the

CRR have been provided to the SHPO, the CHRIS and the curating institution (if archaeological materials were collected).

CUL-5 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment. The training may be presented in the form of a video. The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. Information that the CRS, alternate CRS, and CRMs have the authority to halt construction to the degree necessary, as determined by the CRS, in the event of a discovery or unanticipated impact to a cultural resource;
4. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery, and shall contact their supervisor and the CRS or CRM; and that redirection of work would be determined by the construction supervisor and the CRS;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. An acknowledgement form signed by each worker indicating that they have received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.
8. No ground disturbance shall occur prior to implementation of the WEAP program, unless specifically approved by the CPM.

Verification: The project owner shall provide in the Monthly Compliance Report the WEAP Certification of Completion form of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs shall monitor ground disturbance full time in the vicinity of the project site, linears and ground disturbance at laydown areas or other ancillary areas to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner. In the event that the CRS determines that full-time monitoring is not necessary in certain locations, a letter or e-mail providing a detailed justification for the decision to reduce the level of monitoring shall be provided to the CPM for review and approval prior to any reduction in monitoring.

CRMs shall keep a daily log of any monitoring or cultural resource activities and the CRS shall prepare a weekly summary report on the progress or status of cultural resources-related activities. The CRS may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

The CRS and the project owner shall notify the CPM by telephone or e-mail of any incidents of non-compliance with the conditions of certification and/or applicable LORS upon becoming aware of the situation. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the conditions of certification.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these conditions of certification.

A Native American monitor shall be obtained, to monitor ground disturbance in areas where Native American artifacts may be discovered. Informational lists of concerned Native Americans and Guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored.

Verification: During the ground disturbance phases of the project, if the CRS wishes to reduce the level of monitoring occurring at the project, a letter or e-mail identifying the area(s) where the CRS recommends the reduction and justifying the reductions in monitoring shall be submitted to the CPM for review and approval. Documentation justifying a reduced level of monitoring shall be submitted to the CPM at least 24 hours prior to the date of planned reduction in monitoring.

During the ground disturbance phases of the project, the project owner shall include in the MCR to the CPM copies of the weekly summary reports prepared by the CRS regarding project-related cultural resources monitoring. Copies of daily logs shall be retained and made available for audit by the CPM.

Within 24 hours of recognition of a non-compliance issue with the conditions of certification and/or applicable LORS, the CRS and the project owner shall notify the CPM by telephone of the problem and of steps being taken to resolve the problem. The telephone call shall be followed by an e-mail or fax detailing the non-compliance issue and the measures necessary to achieve resolution of the issue. Daily logs shall include forms detailing any instances of non-compliance. In the event of any non-compliance issue, a report written no sooner than two weeks after resolution of the issue that describes the issue, resolution of the issue and the effectiveness of the resolution measures, shall be provided in the next MCR.

One week prior to ground disturbance in areas where there is a potential to discover Native American artifacts, the project owner shall send notification to the CPM identifying the person(s) retained to conduct Native American monitoring. The project owner shall also provide a plan identifying the proposed monitoring schedule and information explaining how Native Americans who wish to provide comments will be allowed to comment. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The

CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS and the CRMs in the event previously unknown cultural resource sites or materials are encountered, or if known resources may be impacted in a previously unanticipated manner (discovery). Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event cultural resources are found or impacts can be anticipated, the halting or redirection of construction shall remain in effect until all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e. work stoppage or redirection), a recommendation of eligibility and recommendations for mitigation of any cultural resources discoveries whether or not a determination of significance has been made.
2. The CRS, the project owner, and the CPM have conferred and determined what, if any, data recovery or other mitigation is needed; and
3. Any necessary data recovery and mitigation has been completed.

At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS and CRMs have the authority to halt construction activities in the vicinity of a cultural resource discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

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HAZARDOUS MATERIALS

Geoff Lesh and Rick Tyler

INTRODUCTION

The purpose of this analysis is to determine if the proposed Salton Sea Unit 6 Project (SSU6) will result in the potential for a significant impact on the public as a result of the use, handling or storage of hazardous materials at the proposed facility. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and thus employees, in exchange for compensation, accept a higher level of risk than would be acceptable for general public exposure. Workers are therefore not afforded the same level of protection normally provided to the public. Further, workers can be provided with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials (see staff's **Worker Safety and Fire Protection** analysis).

Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, will be present at the proposed facility. However, these materials pose no significant potential for off-site impacts as a result of the quantities on site, their relatively low toxicity, and/or their low environmental mobility.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

FEDERAL

The Superfund Amendments and Reauthorization Act of 1986 (Pub. L. 99-499, §301,100 Stat. 1614 [1986]), also known as SARA Title III, contains the Emergency Planning and Community Right To Know Act (EPCRA) as codified in 42 U.S.C. §11001 et seq. This Act requires that certain information about any release to the air, soil, or water of an extremely hazardous material must be reported to state and local agencies.

The Clean Air Act (CAA) of 1990 (42 U.S.C. §7401 et seq. as amended) established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The CAA section on Risk Management Plans - codified in 42 U.S.C. §112(r) - requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of the CAA are reflected in the California Health and Safety Code, section 25531 et seq.

STATE

The California Accidental Release Prevention Program (Cal-ARP) - Health and Safety Code, section 25531 - directs facility owners storing or handling acutely hazardous materials in reportable quantities, to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local Administering Agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any pre-existing evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan (RMPP).

Section 25503.5 of the California Health and Safety Code requires facilities which store or use hazardous materials to prepare and file a Business Plan with the local Certified Unified Program Authority (CUPA), in this case the Imperial Valley Health Department, Division of Environmental Health. This Business Plan is required to contain information on the business activity, the owner, a hazardous materials inventory, facility maps, an Emergency Response Contingency Plan, an Employee Training Plan, and other record keeping forms.

Title 8, California Code of Regulations, section 5189, requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

California Health and Safety Code, section 41700, requires that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

LOCAL AND REGIONAL

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials in Articles 79 and 80. The latest revision to Article 80 was adopted in 1997 (Uniform Fire Code, 1997).

The California Building Code contains requirements regarding the storage and handling of hazardous materials. The Chief Building Official must inspect and verify compliance with these requirements prior to issuance of an occupancy permit. A further discussion of these requirements is provided in the **Seismic Issues** section of this staff assessment.

If not for Energy Commission jurisdiction, the Imperial County Environmental Management Department would be the issuing agency for the Consolidated Hazardous Materials Permit. The permit review and mitigation authority covers hazardous

materials, hazardous waste, compressed gases and tiered treatment, and the Hazardous Materials Business Plan. In regards to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials must conform to the 1997 Uniform Building Code, the 1998 California Building Code, and the Imperial County Building Code.

SETTING

SITE AND VICINITY DESCRIPTION

The project is composed of a geothermal Resource Production Facility (RPF), a Power Generation Facility (PGF), and ancillary facilities. The SSU6 project includes a high efficiency condensing steam turbine with a net plant output of 185 MW with a corresponding brine production rate of 12,815 kilopounds per hour (kph). Normally, the facility will be operated in a base load mode: 8,000 hours per year or more. The design of the RPF is based on crystallizer reactor clarifier technology (CE Obsidian Energy LLC AFC 2002), to process the brine and produce turbine-quality steam.

The RPF includes all the brine and steam handling facilities from the production wellheads, through the crystallizer/clarifier system, to the injection wellheads. It also includes a solids handling system for brine solids processing, a brine pond, steam polishing equipment designed to provide turbine-quality steam to the PGF, and appropriate steam-venting vessels to support operations during startup/shutdown and emergency conditions.

The PGF includes a condensing turbine/generator set, the gas removal and abatement systems, and the heat rejection system. The PGF also includes a 161 kV switchyard and several power-distribution centers. Common facilities include a control building, a service water pond, and other ancillary facilities.

THE PGF will include a multi-casing, triple-pressure, exhaust flow-condensing turbine. Heat rejection for the steam turbines will be accomplished with a counterflow cooling tower. The turbine generator will be nominally rated at 200 MW with a net plant capacity of 185 MW.

The SSU6 site is in the Imperial Valley, southeast of the Salton Sea. The Imperial Valley is the southwest part of the Colorado Desert that merges northwestward into the Coachella Valley near the northern shore of the Salton Sea.

The site is in a region of the Imperial Valley characterized mostly by agriculture and geothermal power production. The surrounding area is dominated by agriculture.

The town of Niland is approximately 7.5 miles northeast, and the town of Calipatria is approximately 6.1 miles southeast of the plant site. The Sonny Bono Wildlife Refuge Headquarters is approximately 4,000 feet from the plant site. The Alamo River and New River are approximately 4.8 miles southwest, and 2.7 miles east of the plant site, respectively. Nine geothermal power plants are within a 2-mile radius of the proposed plant site. Units 1, 2, 3, 4 and 5 Geothermal Power Plants are to the southeast. The

J.J. Elmore and Leathers geothermal power plants are to the northeast. Approximately 80 acres of land will be required to accommodate the plant facilities.

Several factors associated with the area in which a project is to be located affect its potential to cause public health impacts from an accidental release of a hazardous material. These include:

- The local meteorology,
- Terrain characteristics, and
- The location of population centers and sensitive receptors relative to the project.

Staff considered these factors, as discussed below, in assessing the potential public health impacts of the project.

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction and air temperature, affect the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the level of public exposure to such materials and the associated health risks. When wind speeds are low and stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the air quality section of the AFC (CEOE, 2002a.). This data indicates that wind speeds below 1.5 meter per second and temperatures exceeding 100 degrees F can occur in the project area. Because the geothermal steam contains concentrations of about 3400 ppm H₂S, staff suggested that the applicant use 'F'-stability (stagnated air, very little mixing), 1.5 meter/second wind speed and an ambient temperature of 112 degrees F in its modeling analysis of an accidental release to reflect worst case atmospheric conditions. These conditions were reflected in the modeling used to estimate the potential worst case impacts associated with an accidental geothermal steam release.

TERRAIN CHARACTERISTICS

The location of elevated terrain (terrain above the power plant stack height) is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The principal risk of accidental release at this facility is associated with H₂S that is contained in the geothermal steam. However, modeling of an accidental release of geothermal steam (with included H₂S) indicates that significant concentrations of H₂S would be confined to the facility property. Thus, elevated terrain is not an important factor affecting the modeled results.

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses (Calabrese 1978). Also, the location of the population in the area surrounding a project site may have a large bearing on health

risk. There are no schools, day care facilities, convalescent homes, or hospitals within 3 miles of the plant site. The nearest sensitive receptor location is a residence at the Sonny Bono Wildlife Refuge about 0.75 miles from the proposed facility. Only five sensitive receptors were identified within a 3-mile radius of the plant site, all residences. (CE Obsidian Energy, AFC 2002).

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed Salton sea Unit #6 power plant (please refer to **Socioeconomics** figure 1 in this staff assessment), and census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on the Hazardous Materials analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no Hazardous Materials environmental justice issues related to this project.

IMPACTS

A variety of hazardous materials are proposed for storage and use during the construction of the project and for routine plant operation and maintenance. All hazardous materials to be used during operation of the facility are included in the AFC in Table 5.14-1. Most of these hazardous materials are stored in small quantities, such as corrosion inhibitors and water conditioners, and will be present at the proposed facility. However, these materials pose no significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, and/or their environmental mobility.

The potential threats from the other hazardous materials are not significant. In order to ensure the lack of potential for an off-site impact from these other hazardous materials, the applicant will be restricted to the use, strength, and quantity of the hazardous materials identified in the AFC (see condition of certification **HAZ-1**).

No substances are proposed to be stored on site in sufficient quantities to qualify as a regulated substance in either the Cal-ARP Program or a federal-regulated substance under Section 112(r) of the Clean Air Act. Therefore, an offsite consequence analysis is not required for any process at the proposed SSU6 Project site. Because no hazardous materials to be stored at the SSU6 Project site trigger Cal-ARP or Section 112(r) of the Clean Air Act requirements, risk management plans also may not required for any process at the SSU6 site, unless stipulated by local agencies having the authority to request them.

Public safety concerns may arise from the construction and operation of a proposed project, especially with respect to the handling, transportation, and storage of hazardous materials. Therefore, the Commission examines each power plant proposal to determine if the facility is designed to ensure the safe handling and storage of these materials. (Related issues are also addressed in the **Waste Management, Worker Safety**, and **Traffic and Transportation** portions of this Preliminary Staff Analysis). A list of hazardous materials and a summary of special handling precautions to be used by Applicant may be found in the AFC.

CUMULATIVE IMPACTS

Although the presence of the SSU6 will increase the amounts of hazardous materials in the local project area, the quantities present and mitigating measures proposed will result in no expected significant cumulative impacts.

MITIGATION

Staff has determined that the proposed mitigation for the SSU6 is adequate to reduce the potential risk of public health impacts associated with hazardous materials accidents to insignificant levels.

FACILITY CLOSURE

The requirements for handling of hazardous materials remain in effect until such materials are removed from the site regardless of facility closure. Therefore, the facility owners are responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that the facility owner abandons the facility in a manner which poses a risk to surrounding populations, staff will coordinate with the California Office of Emergency Services, Imperial County Department of Health, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such emergency action can be provided by federal, state or local agencies until the cost can be recovered from the responsible parties (O.E.S. 1990).

CONCLUSIONS AND RECOMMENDATIONS

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use will pose no potential for significant impacts on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant may be required to develop an RMP. The RMP, if required by the Imperial County Department of Health, will be submitted to EPA, the Imperial County Department of Health, and Energy Commission staff for evaluation. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP, if required, be submitted for concurrent review by EPA, the Imperial County Department of Health, and staff. In addition, staff's proposed conditions of certification also require Imperial County's acceptance of the RMP and staff's approval of the RMP prior to delivery of any hazardous materials to the facility. With adoption of staff's proposed conditions of certification, the project will also comply with Health and Safety Code, section 41700, and it will not pose any potential for significant impacts to the public from hazardous materials releases.

Staff recommends the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed and operated to comply with applicable LORS and to protect the public from significant risk.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material in any quantity or strength not listed in AFC Table 5.14-1 unless approved in advance by the CPM.

Verification: The project owner shall provide to the (CPM), in the Annual Compliance Report, a list of all hazardous materials contained at the facility.

HAZ-2 The project owner shall provide a Risk Management Plan RMP (if required by local regulatory body) to the CUPA and the CPM for review at the time the RMP is first submitted to the U.S. Environmental Protection Agency (EPA). A Hazardous Materials Business Plan HMBP (which shall include the proposed building chemical inventory as per the UFC) shall also be submitted to the CUPA for review and to the CPM for review and approval prior to construction of hazardous materials storage and containment structures. The project owner shall include all recommendations of the CUPA and the CPM in the final HMBP. A copy of the final RMP, including all comments, shall be provided to the CUPA and the CPM once it gets EPA approval.

Verification: At least 30 days prior to the commencement of construction of hazardous materials storage and containment structures, the project owner shall provide the final plans (RMP and HMBP) listed above to the CPM for approval.

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HAZARDOUS MATERIAL MANAGEMENT - not available in on-line version

Appendix B
[Insert here Table 5.14-1 from the AFC]

LAND USE

David Flores

INTRODUCTION

This land use analysis of the Salton Sea Unit 6 (SSU6) focuses on two main issues: the project's consistency with local land use plans, ordinances and policies; and the project's compatibility with existing and planned land uses. In general, an electric generation project and its related facilities may be incompatible with existing and planned land uses if it creates unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts or when it unduly restricts existing or planned future uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

This section describes federal, state, regional, and local land use LORS applicable to the proposed project.

FEDERAL

The United States Bureau of Land Management, California Desert Conservation Area (CDCA) Plan; amended March 1999, addresses the use of public lands in the southeast desert region. It balances the environmental, cultural, and aesthetic values of the desert and its productivity.

LOCAL

County of Imperial

Imperial County General Plan

Under California State planning law, each incorporated City and County must adopt a comprehensive, long-term General Plan that governs the physical development of all lands under its jurisdiction. The general plan is a broadly scoped planning document and defines large-scale planned development patterns over a relatively long timeframe.

The General Plan consists of a statement of development policies and must include a diagram and text setting forth the objectives, principles, standards and proposals of the document. At a minimum, a General Plan has seven mandatory elements including Land Use; Circulation; Housing; Conservation; Open Space; Noise and Safety.

Imperial County administers the State required general plan as a group of documents organized by geographic areas and subject matter and has included an optional Geothermal and Transmission element in its Plan (Government Code, § 65301 & § 65303). **LAND USE Figure 1** shows the general plan designations in the area of the proposed project site.

Land Use Element

The Land Use Element addresses the types and locations of land uses (e.g., residential, industrial, commercial, infrastructure such as roads, wastewater treatment, and utility facilities) that the County Supervisors consider appropriate for the long-range outlook of the General Plan.

Geothermal and Transmission Element

The Geothermal/Transmission Element, amended in 1993 provides the latest knowledge about local geothermal resources, current development, and transmission of geothermal energy. It also provides a framework for review and approval of geothermal projects in the County.

Imperial County Zoning Ordinance

The Imperial County Zoning Ordinance (Title 17 of the Imperial County General Code) establishes land use (zone) districts in the unincorporated area. In each specific land use district, the types of development, dimensions for buildings, and open spaces are regulated for the purpose of implementing the general plan of the county. The purposes of these regulations are protecting existing development, encouraging beneficial new development, and preventing overcrowding and congestion. **LAND USE Figure 2** shows the zoning districts in the area of the proposed project site.

Other Applicable County Policies and Ordinances

Imperial County Encroachment Permit

Division 1, Chapter 6, Section 90106.00 of the Imperial County Land Use Ordinance requires a written permit for construction of any facility below the minus 200-foot contour along any portion of the Salton Sea. This permit would need to be secured if the County was the lead agency for the project. In this instance with the Energy Commission being the lead agency, staff will be working with Imperial County to incorporate the conditions that it would normally require.

Development Permit

Imperial County Land Use Code Title 9, Division 16, Chapter 4 requires development permits for special flood hazard areas. Chapter 3, Section 91603.00 establishes this requirement for all areas of special flood hazards (including lands located at or near the Salton Sea and lying at or below the -200 foot elevation contour). If the County determines that this permit would be applicable if it was the lead agency, staff will work to incorporate its conditions.

SETTING

SITE AND VICINITY DESCRIPTION

The proposed Salton Sea Unit 6 (SSU6) is to be built on a 80-acre portion of an approximately 160-acre parcel located within the block bounded by McKendry Road on the north, Boyle Road on the east, Severe Road on the west, and Peterson Road on the south. The site is 228 feet below sea level, located approximately 7 miles west of State Highway 111 and 10 miles north of State Highway 86.

The parcel is currently being used for row crops and is surrounded by agriculture. The town of Niland is approximately 7.5 miles northeast, and the town of Calipatria is approximately 6.1 miles southeast of the plant site. The Sonny Bono Wildlife Refuge Headquarters is approximately 4,000 feet from the plant site. Nine geothermal power plants are within a 2-mile radius of the proposed plant site. Units 1, 2, 3, 4 and 5 Geothermal Power Plants lie to the southwest, while the Vulcan and Hoch geothermal power plants are to the east. The Elmore and Leathers facilities are to the northwest of the project site.

SURROUNDING LAND USES

Land uses surrounding the site include large parcel agriculture, open space and recreational uses. Specific surrounding uses are described as follows:

- North: Immediately north of the project site are open space/recreation uses such as fishing and bird viewing (i.e., the Refuge) and a small parking area where Production Well Pad OB2 would be placed. In addition, a residence and office associated with the Refuge is approximately 4,000 feet northeast of the project site. The Salton Sea is north of the open space/ recreational area.
- South: Agricultural land.
- East: Agricultural land.
- West: The Sonny Bono Wildlife Refuge Center/open space.

Other uses in the vicinity of the site include residential, commercial developments, and agriculturally related facilities in the community of Calipatria. The Calipatria State Prison is located east of the community, approximately 7.5 miles from the SSU6 site.

Row crop agriculture exists along the project's electric transmission line route from the project site to the Bannister substation.

The production and injection supply line for the project would cross: irrigated agricultural land, open space/recreational, and industrial areas.

PROJECT FEATURES

GENERATING FACILITY

The SSU6 project generating facility would consist of a 185 MW combined cycle plant augmented by 245 MW of duct firing. Approximately 80-acres of land will be required to accommodate the plant facilities, which are comprised of:

- Turbine/generator area
- Resource Production Facility separator/crystallizer/scrubber/brine clarification area
- Electrical/control building area
- Cooling towers
- Filter press area
- Electrical switchyard
- Brine ponds
- Service water pond
- Stormwater detention pond
- Emissions control equipment area
- Parking area

On the plant site there is an access road for fire equipment and facility maintenance.

In addition to the above features of the generating facility, the overall project requires construction of eight production well/pad sites, and associated production/injection well pipelines which would be located above ground. These secondary features are discussed in the **IMPACTS** section.

IMPERIAL IRRIGATION DISTRICT (IID) MIDWAY TRANSMISSION INTERCONNECTION

The linear facilities for the project would include a new 16-mile single-circuit 161-kV transmission line set on approximately 85 new steel transmission poles, with a span of approximately 1,000 feet between poles. The transmission line will generally run along Hooper Road going east to the Midway Substation. Existing land uses within 0.5 miles of the IID Midway Interconnection include agricultural, industrial, residential and open space.

The Calipatria State Prison is located on both the north and south sides of Hooper Road. The IID Midway line would run along Hooper Road in an established right-of-way, with no entry into the prison facility.

L- LINE TRANSMISSION INTERCONNECTION

The SSU6 project will also require the L-Line Interconnection which would be a new 15-mile single-circuit 161-kV transmission line that would include the placement of approximately 79 new steel transmission poles, with a span of approximately 1,000 feet

between poles. This interconnection will tie in to the Imperial Irrigation District's existing line west of the SSU6 plant site. The interconnection line continues approximately 12 miles south along Lack Road and west along Bannister Road, to a new proposed switchyard west of Highway 86. A double circuit line then crosses approximately 2.8 miles of land administered by the BLM to loop into the L-Line southwest of the Bannister/Highway 86 intersection.

If not within a designated corridor, then a CDCA Plan Amendment would be required. The portion of the L-Line that runs through BLM land would not be located within a designated corridor. A condition of certification requirement (**LAND -7**) has been prepared to insure that the applicant secures the necessary right-of-way requirements and prepares and submits to BLM an amendment to the CDCA Plan.

Existing land uses within 0.5 miles of the transmission route includes agricultural, residential, Highway 86 and open space/recreational and residences.

ALTERNATIVE TRANSMISSION LINE ROUTE

The applicant has identified an alternative route segment for the L-Line Interconnection. The alternative would avoid use of a 2.8-mile segment running through Bureau of Land Management (BLM) land, through use of a route along State Highway 86 for approximately 7.5 miles to the intersection of State Highway 86 and the L-Line. Existing land uses along this route include agricultural, residential, open space, and State Highway 86.

WELLS AND WELL PADS

Extraction and injection of the fluids required for plant operation would be provided via 5 new geothermal wells on five well pads and seven brine injection wells on three well pads. The well pads are west, north, and south of the SSU6 site. Except for one production well pad, all well pads are adjacent to existing roads. The pad not adjacent to an existing road (OB3) would require construction of a permanent access road.

LAND USE Figure 3 shows the well and pad locations.

The General Plan land use designation for Production Well Pads OB-2 and OB-3 is Recreation/Open Space, while other pads are designated for Agriculture. Well pads OB-1 through OB-3 are zoned Open Space/GOZ (Geothermal Overlay Zone), and well pads OB-2 through OB-5 are zoned Heavy Agriculture/GOZ. Existing land uses within 0.5 miles of the proposed well pad locations include agricultural, open space/recreational and industrial.

PRODUCTION AND INJECTION PIPELINES

Both production and injection fluid processes associated with the SSU6 facility would require the use of above ground transmission pipelines from the production well pads to the project site, as well as to the injection well pads. The proposed pipeline routes are parallel and adjacent to existing roads.

Existing land uses within 0.5 miles of the production and injection well pipelines include agricultural, open space/recreational, and industrial. Land use designations and zoning

for the pipelines are similar to the associated well pads described in the well pad section above.

WATER SUPPLY PIPELINE

An approximate 500-foot buried 10-inch steel water supply pipeline is required to connect to the service water pond within the facility. Water will piped in directly from the existing Vail 4A laterals (gate 460) on the east side of Boyle Road, adjacent to the berm on the southeastern edge of the facility. A 25-foot right-of-way would be required for construction of the pipeline. Existing land uses within 0.5 miles of the proposed water line include agricultural areas.

IMPACTS

According to Appendix G of the Guidelines to the California Environmental Quality Act (CEQA), a project may have a significant effect on land use if a proposed project would:

- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- disrupt or divide the physical arrangement of an established community; or
- convert Prime Farmland, Farmland of Statewide Importance, or Unique Farmland to non-agricultural use.

A project may also have a significant impact on land use if it would create unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts or if it precludes or unduly restricts existing or planned future uses.

CONFORMITY WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Public Resources Code § 25525 states that the Energy Commission shall not certify any facility when it finds "that the facility does not conform with any applicable state, local, or regional standards, ordinances, or laws, unless the [Energy] commission determines that such a facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity. In making the determination, the commission shall consider the entire record of the proceeding, including, but not limited to the impacts of the facility on the environment, consumer benefits, and electric system reliability." In no event shall the commission make any finding in conflict with applicable federal law or regulation. When determining if a project is in conformance with state, local or regional ordinances or regulations, the Energy Commission typically meets and consults with applicable agencies to determine conformity and, when necessary, "to attempt to correct or eliminate any noncompliance" (§ 25523(d)(1)). The laws, ordinances, regulations, standards (LORS) and policies applicable to the project have been analyzed below to determine the extent to which the SSU6 is consistent or at variance with each requirement or standard.

Project site

California Land Conservation Act of 1965

The 80-acre parcel containing the site does not have a land conservation contract. Also, the property is not within a Williamson Act preserve or a Farmland Security Zone. The linear facilities do not cross Williamson Act preserve lands or a Farmland Security Zone.

Imperial County General Plan/Land Use LORS and Policies

Land Use Element

The General Plan was amended in 1993. It reflects the values and contains the goals of the community regarding development. General Plan policies support the concept that agricultural operations can occur near geothermal development. The following General Plan Land Use policies applicable to the SSU6 project are listed below:

- **Agricultural Standards:** No land shall be removed from the Agriculture category except for annexation to a city, where needed for use by a public agency, or for geothermal purposes.
- **Industrial Standards:** Geothermal plants may be permitted as long as CUP conditions are met, subject to zoning and environmental review. Industrial Standards: Geothermal plants may be permitted as long as Condition Use Permit (CUP) conditions are met, subject to zoning and environmental review. State law provides for certification of a power plant's AFC by the Commission in lieu of any local requirements to obtain a conditional use permit. Therefore, Commission certification of the Project satisfies the County requirements. The Warren-Alquist Act imposes a general "conformity" requirement that a proposed new or modified energy facility meet the local government's zoning standards in order to grant it a license to operate (Section 25525, Warren-Alquist Act). Commission staff will work with the County of Imperial to insure that CUP conditions are implemented.
- **Recreational/Open Space Standards:** The Recreation/Open Space category includes areas for the conservation and managed production of mineral resources. Under the (S-1) Recreational/Open Space Zone, buildings or structures shall not exceed 35 feet (Title 9, Division 5, Chapter 18). The applicant has stated that the three well structures shall not exceed 35 feet, and will be a compatible use within this zone. These well pads, as part of the proposed project, are for the purpose of managed production of resources.

Imperial County Zoning Ordinance

The proposed project site is within an "A-3-G" (Heavy Agricultural, Geothermal Overlay Zone) District (County of Imperial, 2001). Agricultural districts or A districts are established to promote agricultural and other non-urban uses, to conserve and protect existing agricultural uses, and to provide space for and encourage such uses in places where more intensive development is not desirable or necessary for the general welfare (County Zoning Ordinance, Section 17.06.010). Public utility buildings or uses, excluding such uses as a business office, storage garage, repair shop or corporation yard, would require a conditional use permit (Item J, County Zoning Ordinance Section 17.06.060), if Imperial County was the lead agency.

To ensure that the SSU6 conforms to the Imperial County Zoning Code, staff is recommending that the Commission require the following Conditions of Certification:

- **LAND-1** regarding compliance with the design and performance standards for the A-3-G Zoning District;
- **LAND-2** regarding compliance with the County's parking standards;
- **LAND-3** regarding compliance with the County's outdoor advertising regulations applicable to any SSU6 signs erected (either temporary or permanent);
- **LAND-4** regarding the County's review and comment on descriptions of the final laydown/staging areas identified for construction of the SSU6;
- **LAND-5** regarding compliance with the County's requirements for minimum setbacks from the property line;

Imperial County Encroachment and Development Permits

Staff is awaiting word from Imperial County as to whether conditions associated with these Salton Sea - related permits would be applicable to the project. The applicability is uncertain since the SSU6 site is set back from the Sea, and the plant site would be surrounded by an 8-foot berm.

Linear Facilities

Bureau of Land Management/California Desert Conservation Area Plan (CDCA)

The placement of transmission lines on BLM land in this region must meet requirements stipulated in the BLM's California Desert Conservation Area (CDCA) Plan. The transmission line route would cross an area identified in the CDCA as Multiple-Use Class M (Moderate Use). This class provides for a variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. New transmission line facilities are an allowed use in the Class M areas, only within designated corridors.

The BLM permit process is also discussed in the biological resources section. If the applicant chooses its proposed transmission line route over the alternative, condition of certification **LAND-7** will take effect. It requires completion of the BLM right-of-way grant permit process.

Imperial County General Plan and Zoning Ordinance

Most of the County General Plan land use designations along the IID Midway and L-Line transmission routes, and the alternative route are agriculture, with Special Purpose Facility where the Calipatria State Prison is located, and some areas designated for geothermal. The SSU6's linear facilities would be consistent with these designations. The County's zoning classifications along the two SSU6 transmission line routes and the alternative route are generally agricultural with some areas designated open space. Transmission lines are permitted uses in these zones, and all other zones in Imperial County.

COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

Project Site

The project would be constructed on an 80-acre portion of a 160-acre agriculturally designated parcel owned by the applicant.

Of the various zoning districts in the County's Zoning Ordinance, the Heavy Industrial Agriculture, Geothermal "A-3-G" zoning district in which the project site is located, is the most appropriate zoning district for a power plant, which is intended to provide for public utility facilities. Power plants are specifically listed as a compatible use in the "A-3-G" District, subject to a conditional permit, which the County would process if it were the lead agency. The project complies with all of the applicable development standards (lot, and yard requirements) set forth in the Zoning Ordinance for the "A-3-G" District. Staff is currently working with the Imperial County Planning Department in obtaining additional conditions of certification to insure compliance with their local LORS. Any additional condition requirements will be reflected in the Final Staff Assessment.

Existing land uses in the vicinity of the site consist of large acreage agricultural lands and agricultural related operations, the Sonny Bono Salton Sea National Wildlife Refuge and existing geothermal power plant facilities. Recreational users of the Salton Sea (approximately 1,000 feet from the facility) and the Sonny Bono Salton Sea National Wildlife Refuge (approximately 2,500 feet from the facility), could be affected by air quality impacts and the visual impacts of the potential plume from the proposed facility. As travelers on State Highway 111 and 115 approximately 5 miles from the project site, McKendry Road users could be similarly affected by visual impacts of the facility. These impacts are addressed in greater detail in the air quality and visual resources sections of the PSA.

The SSU6 project's construction and operation phase would not preclude residents and other users of the recreational facilities located in Imperial County from pursuing community activities.

Staff believes that the project's consistency with: 1) the County's land use designation and zoning for the site; and 2) the current development pattern for the area established by Imperial County is consistent with the General Plan and zoning ordinance, and that the SSU6 is an allowed and compatible use for the area. Staff believes that the proposed geothermal resource development will be compatible with the surrounding agricultural operations, and the open space/recreational activities occurring at the nearby wildlife refuge. Staff believes that the existing geothermal facilities in the vicinity are compatible with surrounding uses, and SSU6 will be similar.

Conversion of Prime Farmland

The project's construction would result in the conversion of 173-acres of land considered "Prime Farmland" by the California Department of Conservation. The 173-acres consist of the project site, production/well pad sites, and the production/injection well pipelines, which would be located above ground. Staff considers the loss and conversion of productive agricultural land to be a potentially significant impact under CEQA. In order to help offset the project-related impacts from the loss of prime

agricultural land, **LAND- 6** requires that the applicant, in coordination with Imperial County: 1) mitigate for this impact by contributing funds to Imperial County for a 1:1 purchase of prime agricultural land for permanent farming use and/or easement purchases; and 2) establish a local agricultural land trust. Staff believes that with the implementation of **Condition of Certification LAND- 6**, the SSU6 is compatible with existing and planned land uses in the Salton Sea area, and impacts would be less than significant.

Linear Facilities

Disruption or Division of an Established Community

The water supply and transmission line alignments would temporarily affect land currently being used in agricultural production. The topsoil in these areas would be removed during the construction period, and temporarily converted to non-agricultural use by this project. Soil surface would be returned to the original grades and agricultural use upon completion of construction activities. Therefore, no existing farmlands would be permanently converted to non-agricultural use for the SSU6's water supply and transmission line facilities. The impacts would be less than significant.

The production/injection pipelines will be installed above ground and would affect land currently being used in agricultural production. The topsoil in these areas would be graded and compacted and converted to a non-agricultural use by this project. Therefore, existing farmland would be permanently converted to non-agricultural use for the SSU6's production /injection pipelines. The impacts would be significant requiring mitigation for the loss of prime agricultural land. In order to help offset the project's production/injection pipeline impacts, **LAND-6** requires that the applicant mitigate for the loss of prime farmland.

As discussed earlier in this report, both the proposed IID Midway Line transmission line route, the L-Line Interconnection, and the alternative route would be installed within dedicated right-of-ways along local roads and/or State Highway 86. They would not affect adjacent farmland activities.

CUMULATIVE IMPACTS

The proposed project is consistent with the County of Imperial's (County) long-range land use policies for this geothermal/industrially-designated area as expressed in the General Plan. Conformance with the General Plan is the primary consideration in determining a project's potential to contribute to adverse cumulative land use impacts. Therefore, projects that are consistent with the County's long-range land use policies are not viewed as adverse from a cumulative impact perspective. The General Plan sets forth the County's long-range vision for the physical development of the unincorporated areas, and other plans for infrastructure and public services are based on this long-range vision.

The General Plan envisions both long-term agriculture and continuation of geothermal development in the site vicinity. At this time, there are no other project proposals in the vicinity of the SSU6 project. The project is consistent with the County's long-range

planning policies for geothermal development in this area, therefore cumulative land use impacts are not considered significant. Although the project will contribute to the cumulative loss of agricultural land in the County, the applicant will be mitigating for the impact of conversion of prime farmland.

The proposed project is not expected to make a significant contribution to regional impacts related to new development and growth, such as population immigration, the resultant increased demand for public services, and expansion of public infrastructure such as water pipelines to serve residential development.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the Minority population is greater than fifty percent within a six-mile radius of the proposed Salton Sea Unit #6 power plant (please refer to **SOCIOECONOMICS Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on the land use analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no land use environmental justice issues related to this project.

FACILITY CLOSURE

At some point in the future, the proposed facility would cease operation and close down. At that time, it would be necessary to ensure that closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

The planned lifetime of the SSU6 plant is estimated at thirty years. At least twelve months prior to the initiation of decommissioning, the Applicant would prepare a Facility Closure Plan for Energy Commission review and approval. This review and approval process would be public and allow participation by interested parties and other regulatory agencies. At the time of closure, all applicable LORS would be identified and the closure plan would discuss conformance of decommissioning, restoration, and remediation activities with these LORS. All of these activities would fall under the authority of the Energy Commission.

There are at least two other circumstances under which a facility closure can occur, unexpected temporary closure and unexpected permanent closure. Staff has not identified any LORS from a land use perspective that the applicant would have to comply with in the event of unexpected temporary closure or unexpected permanent closure of the SSU6.

CONCLUSIONS

1. Staff believes that the project is consistent with the County's land use designation and zoning for the site.
2. Staff supports the applicant's effort to reach a mitigation agreement with the County regarding the conversion and loss of productive agricultural land, which is a potentially significant impact. After reviewing the final agreement, Staff has

concluded that in order to reduce the potentially significant impact to a level of insignificance under CEQA, the applicant must comply with **Condition of Certification LAND-6** in providing a mitigation fee for the loss of prime agricultural land.

3. The project would not disrupt or divide the physical arrangement of an established community. The communities of Calpatria and Niland are approximately 6 miles and 7.5 miles away respectively from the subject property.
4. The project would not preclude or unduly restrict existing or planned land uses. The project would not preclude or unduly restrict the conducting of agricultural land uses on neighboring properties.
5. With mitigation, operation of the project would not cause any significant noise, dust, public health, traffic, or visual impacts to nearby land uses, nor would the operation of the SSU6 contribute substantially to any cumulative land use impacts.

If the project is certified, staff recommends that the Commission adopt the following proposed Conditions of Certification.

PROPOSED CONDITIONS OF CERTIFICATION

LAND-1 The project owner shall comply with the minimum design and performance standards for the "A-3-G" District set forth in the Imperial County Zoning Ordinance.

Verification: At least 30 days prior to the start of construction, the project owner shall submit written documentation, including evidence of review by the Imperial County Community Development Agency that the project meets the above standards.

LAND-2 The project owner shall comply with the parking standards established by the Imperial County Zoning Ordinance (Title 9, Division 4).

Verification: At least 30 days prior to start of construction, the project owner shall submit to the CPM, written documentation, including evidence of review by Imperial County, that the project conforms to all applicable parking standards.

LAND-3 The project owner shall ensure that any signs erected (either permanent or for construction only) comply with the outdoor advertising regulations established by the Imperial County Zoning Ordinance (Title 9, Division 4).

Verification: At least 30 days prior to start of construction, the project owner shall submit to the CPM, written documentation, including evidence of review by Imperial County, that all erected signs will conform to the zoning ordinance.

LAND-4 The project owner shall provide the Director of the Imperial County Planning Department for review and comment and the CPM for review and approval, descriptions of the final lay down/staging areas identified for construction of the project. The description shall include:

- (a) Assessor's Parcel numbers;

- (b) addresses;
- (c) land use designations;
- (d) zoning;
- (e) site plan showing dimensions;
- (f) owner's name and address (if leased); and,
- (g) duration of lease (if leased); and, if a discretionary permit was required, copies of all discretionary and/or administrative permits necessary for site use as lay down/staging areas.

Verification: The project owner shall provide the specified documents at least 30 days prior to the start of any ground disturbance activities.

LAND-5 The project owner shall provide to the CPM for approval, a site plan with dimensions showing the locations of the proposed buildings and structures in compliance with the minimum yard area requirements (setbacks) from the property line as stipulated in the Imperial County Zoning Ordinance.

Verification: Thirty (30) days prior to the start of construction, the project owner shall submit a site plan showing that the project conforms to all applicable yard area requirements as set forth in the Imperial County Zoning Ordinance.

LAND-6 The project owner shall mitigate for the loss of 173-acres at a one to one ratio for the conversion of prime farmland as classified by the California Department of Conservation, to a non-agricultural use, for the construction of the power generation facility.

Verification: The project owner will provide a mitigation fee payment (payment to be determined) to an Imperial County agricultural land trust within 30 days following the construction start, as set forth in a prepared Farmlands Mitigation Agreement.

The project owner shall provide in the Monthly Compliance Reports a discussion of any land and/or easements purchased in the preceding month by the trust with the mitigation fee money provided, and the provisions to guarantee that the land managed by the trust will be farmed in perpetuity. This discussion must include the schedule for purchasing 173 acres of prime farmland and/or easements within five years of start of construction as compensation for the 173 acres of prime farmland to be converted by the SSU6.

LAND-7 The project owner shall provide to the CPM, copies of the BLM Right-of Way grant and Plan Amendment for the CDCA.

Verification: Thirty (30) days prior to the start of any project-related construction the project owner shall submit copies of the BLM right-of-way grant and documentation that a Plan Amendment for the CDCA was completed.

REFERENCES

CE Obsidian Energy, LLC Calipatria, California (CEOE) 2002a. Application for Certification for Salton Sea Unit 6, Geothermal Power Plant Project Volume I & II. July 26, 2002.

CE Obsidian Energy, LLC Calipatria, California (CEOE), 2002e. Supplemental Information for the Salton Sea Unit 6 AFC. September 18, 2002.

California Energy Commission (CEC) 2003a. Staff Data Requests 3 for 02-AFC-2. February 5, 2003.

California Department of Conservation (DOC), 1998. Farmland Mapping and Monitoring Program Map for Imperial County. Division of Land Resource Protection, Sacramento.

County of Imperial, 1996. Imperial County General Plan. Imperial County Planning and Building Department.

County of Imperial. 1998. Imperial County Land Use Ordinance. [online]
http://www.co.imperial.ca.us/planning/planning_div/land_use_ordinance.htm

County of Imperial, Planning Division. Personal conversation with Richard Cabanilla on December 6, 2002

**LAND USE Figure 1
General Map Land Use Map**

**LAND USE Figure 2
Zoning Map**

**LAND USE Figure 3
Wells and Pad Locations**

NOISE AND VIBRATION

Steve Baker

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances, and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Salton Sea Unit 6 (SSU6) Project, and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations, and standards (LORS). For an explanation of technical terms employed in this testimony, please refer to **NOISE Appendix A** immediately following.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **NOISE Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 VdB, which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in **NOISE Table 1**.

The State of California, Office of Noise Control, prepared a Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. The Model also contains a definition of a simple tone, or “pure tone,” in terms of one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five dBA.

Other State LORS include the California Occupational Safety and Health Administration (Cal-OSHA) regulations.

Cal-OSHA

Cal-OSHA has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see **NOISE Appendix A, Table A4**).

Local

Imperial County General Plan Noise Element

The County’s General Plan Noise Element sets standards for the control of noise. The Noise Element defines “sensitive receptors” to include residences, schools, hospitals, parks and office buildings; it further states that riparian bird species may also be considered sensitive receptors (Imperial 2001, § II.C). It goes on to present Noise/Land Use Compatibility Guidelines, which can be summarized thus (Imperial 2001, Table 7):

- Residential, Hotels/Motels, Schools, Libraries, Churches, Hospitals and Nursing Homes — 60 dBA CNEL is normally acceptable
- Office Buildings, Business and Commercial — 65 dBA CNEL is normally acceptable
- Playgrounds, Parks, Golf Courses and Water Recreation — 70 dBA CNEL is normally acceptable
- Industrial, Manufacturing, Utilities and Agriculture — 70 dBA CNEL is normally acceptable

NOISE Table 1
Land Use Compatibility for Community Noise Environment

| LAND USE CATEGORY | COMMUNITY NOISE EXPOSURE - Ldn or CNEL (dB) | | | | | | | |
|--|---|----|----|----|----|----|----|--|
| | 50 | 55 | 60 | 65 | 70 | 75 | 80 | |
| Residential - Low Density Single Family, Duplex, Mobile Home | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Residential - Multi-Family | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Transient Lodging – Motel, Hotel | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Schools, Libraries, Churches, Hospitals, Nursing Homes | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Auditorium, Concert Hall, Amphitheaters | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Sports Arena, Outdoor Spectator Sports | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Playgrounds, Neighborhood Parks | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Golf Courses, Riding Stables, Water Recreation, Cemeteries | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Office Buildings, Business Commercial and Professional | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Industrial, Manufacturing, Utilities, Agriculture | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | Normally Acceptable Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. | | | | | | | |
| | Conditionally Acceptable New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. | | | | | | | |
| | Normally Unacceptable New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design. | | | | | | | |
| | Clearly Unacceptable New construction or development generally should not be undertaken. | | | | | | | |

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

Objectives of the Noise Element include controlling noise at the source where feasible (Imperial 2001, § III.B, Goal 1, Objective 1.3).

The Noise Element sets property line noise limits based on the presence of a sensitive receptor on the property receiving the noise. These limits are summarized in **NOISE Table 2**.

NOISE Table 2
Imperial County General Plan Property Line Noise Limits

| Zone | Time | 1-hour Average Sound Level, dB |
|--------------------------------------|-------------------|--------------------------------|
| Residential | 7 a.m. to 10 p.m. | 50 |
| | 10 p.m. to 7 a.m. | 45 |
| Multi-Residential | 7 a.m. to 10 p.m. | 55 |
| | 10 p.m. to 7 a.m. | 50 |
| | 7 a.m. to 10 p.m. | 60 |
| | 10 p.m. to 7 a.m. | 55 |
| Light Industrial and Industrial Park | Anytime | 70 |
| General Industrial | Anytime | 75 |

Source: Imperial 2001, Table 9

The Noise Element further states that construction noise shall not exceed 75 dB L_{eq} at the nearest sensitive receptor, averaged over eight hours. Construction equipment operation shall be limited to the hours of (Imperial 2001 § IV.C.3):

- Monday through Friday 7 a.m. to 7 p.m.
- Saturday 9 a.m. to 5 p.m.
- Sunday and Holidays Not allowed

If the noise level at a receptor, with the project complete, is within the “normally acceptable” range of the Noise/Land Use Compatibility Guidelines cited above, and the project has increased noise levels 5 dB CNEL or more, then the project is deemed to have created a potentially significant noise impact, and mitigation measures must be considered. If the noise level at a receptor, with the project complete, is above the “normally acceptable” range of the Noise/Land Use Compatibility Guidelines, and the project has increased noise levels 3 dB CNEL or more, then the project is also deemed to have created a potentially significant noise impact, and mitigation measures must be considered (Imperial 2001, § IV.C.4.a, IV.C.4.b).

The Noise Element allows the institution of required noise reduction measures either at the source of the noise, along the path of the noise from source to receptor, or at the receptor (Imperial 2001, § IV.D.8). Preference is given to reduction at the source or along the path, but in certain cases, such as there being only one receptor, reduction at the receptor is recognized as most cost effective, and therefore acceptable (Imperial 2001, § IV.D.8.c).

Imperial County General Plan Geothermal/Transmission Element

The Geothermal/Transmission Element sets limits on noise from geothermal facilities. The maximum continuous noise level, measured at the nearest human receptor outside the parcel boundary, may not exceed 60 dBA CNEL. Further, specific limits are established for noise from geothermal well drilling operations. These limits can be summarized thus (Imperial 2001):

- Drilling noise must be limited to 60 dBA CNEL, measured as described above.

- Diesel-driven drilling equipment operated within 300 feet of any residence must have hospital-type mufflers, and well venting and testing equipment used in such locations must include an effective silencer.
- All drilling preparation work, including racking and/or making up drill pipes, must be done between 7 a.m. and 7 p.m. if within 300 feet of any residence.
- Impulsive noises, such as sudden steam venting, must be controlled by a muffler or other sound attenuating system.

If the above requirements are met, drilling may continue 24 hours per day.

Imperial County Noise Ordinance

The County's Noise Ordinance (Imperial 1998) establishes sound level limits, as summarized in **NOISE Table 3**:

NOISE Table 3
Imperial County Noise Ordinance Sound Level Limits

| Zone | Time of Day | Hourly Limit, dB L _{eq} |
|--|-------------------|----------------------------------|
| Single Family Residential (R-1) | 7 a.m. to 10 p.m. | 50 |
| | 10 p.m. to 7 a.m. | 45 |
| All Other Residential | 7 a.m. to 10 p.m. | 55 |
| | 10 p.m. to 7 a.m. | 50 |
| Commercial | 7 a.m. to 10 p.m. | 60 |
| | 10 p.m. to 7 a.m. | 55 |
| Manufacturing, Industrial, Agricultural & Extraction | Anytime | 70 |
| General Industrial | Anytime | 75 |

Source: Imperial 1998, § 90702.00 A

SETTING

PROJECT BACKGROUND

The SSU6 Project involves the construction and operation of a nominal 185 MW geothermal power plant. The SSU6 Project would include ten geothermal brine production wells; seven brine reinjection wells; brine flash and treatment tanks and vessels; a 200 MW gross triple pressure steam turbine generator with condenser; a heat rejection system incorporating piping, circulating water pumps and two evaporative cooling towers; and three emergency diesel generators (CEOE 2002a, AFC §§ 1.2, 1.3.2.1, 3.1, 3.3.1, 3.3.4.1.4).

The equipment that has the greatest potential to generate significant noise levels includes the steam turbine generator, the cooling towers, and the diesel generators (CEOE 2002a, AFC § 5.11.2.2.2).

Power Plant Site

The project site is located on the southeast side of the Salton Sea, near Obsidian Butte. The headquarters facilities of the Sonny Bono National Wildlife Refuge lie approximately

4,000 feet NE of the project site, and 2,500 feet NE of the nearest geothermal well pad (CEOE 2002a, AFC §§ 1.3.1, 5.11.1.2.1).

Linear Facilities

Linear facilities included in the project would consist of:

1. two electrical transmission interconnection lines, to an existing transmission line and to the existing Midway substation, 16 and 15 miles in length respectively;
2. piping carrying geothermal brine from the 10 production wells to the power plant;
3. piping conveying spent brine from the power plant to the seven reinjection wells; and
4. a 500-foot long, 10-inch diameter pipeline conveying canal water to the power plant site for use in spent brine dilution and as potable water (CEOE 2002a, AFC §§ 1.3.2.3, 3.1, 3.2.2, 3.2.2.1, 3.3.2.1, 3.3.4.2).

ANALYSIS

California Environmental Quality Act

CEQA requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

- a. exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
- b. exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- c. a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- d. a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item c) above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by five dBA L_{90} or more at the nearest sensitive receptor.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is clearly significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of a case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level¹;
2. the duration and frequency of the noise;
3. the number of people affected;
4. the land use designation of the affected receptor sites; and
5. public concern or controversy as demonstrated at workshops or hearings, or by correspondence.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

1. the construction activity is temporary;
2. use of heavy equipment and noisy activities is limited to daytime hours; and
3. all industry-standard noise abatement measures are implemented for noise-producing equipment.

EXISTING NOISE LEVELS

In order to predict the likely effects of project noise on adjacent sensitive receptors, CE Obsidian Energy LLC (CEOE, or the applicant) commissioned an ambient noise survey of the area. The survey was conducted at the power plant site and the well pad sites on Thursday, June 7, 2001, and at the residence at the Wildlife Refuge headquarters on Thursday and Friday, January 10 and 11, 2002, using acceptable equipment and techniques. The survey monitored existing noise levels at the following ten locations, shown on **NOISE Figure 1**:

1. Location ML-1: At the proposed power plant site. Existing noise is chiefly due to farm equipment on nearby agricultural fields, operation of nearby geothermal power plants, traffic on Gentry Road, birds, and an irrigation pump on the NW portion of the property. Measurements here consisted of a one-hour period during the day, and another during the nighttime hours.
2. Locations ML-2 through ML-9: At each of the well pad sites. Noise sources are similar to those at ML-1. Measurements here consisted of a ten-minute period during the day.

¹ For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments, and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

3. Location ML-10: At the residence at the headquarters facilities of the Sonny Bono National Wildlife Refuge, approximately 4,000 feet NE of the proposed power plant site and 2,500 feet NE of the nearest well pad. Measurements here consisted of 25 consecutive one-hour measurements.

NOISE Table 4 summarizes the ambient noise measurements.

NOISE Table 4
Summary of Measured Noise Levels

| Measurement Sites | Measured Noise Levels, dBA | | |
|--------------------------------|-----------------------------------|-----------------|---|
| | Average During Measurement Period | | Community Noise Equivalent Level (CNEL) |
| | L _{eq} | L ₉₀ | |
| 1 – Power Plant Site – Daytime | 59.6 | 58.1 | Not Applicable |
| Nighttime | 48.1 | 43.8 | |
| 2 – Production Well Pad OB-1 | 57.2 | 51.1 | |
| 3 – Production Well Pad OB-2 | 48.6 | 44.7 | |
| 4 – Production Well Pad OB-3 | 45.0 | 40.7 | |
| 5 – Production Well Pad OB-4 | 68.4 | 67.7 | |
| 6 – Production Well Pad OB-5 | 71.9 | 71.8 | |
| 7 – Injection Well Pad OBI-3 | 63.0 | 43.7 | |
| 8 – Injection Well Pad OBI-2 | 52.9 | 44.9 | |
| 9 – Injection Well Pad OBI-1 | 42.3 | 38.7 | |
| 10 – Residence at Refuge HQ* | 41.4 | 36.3 | 52.0 |

Source: CEOE 2002a, AFC Tables 5.11-2 and 5.11-3 and staff calculations

* Averages based on four quietest hours, i.e., 2:30 to 6:30 a.m.

In general, the noise regime in the vicinity of the project site is a typical rural environment, dominated by agricultural and wildlife noises.

IMPACTS

Noise impacts associated with the project can be created by short-term construction activities, and by normal long-term operation of the power plant.

PROJECT SPECIFIC IMPACTS — CONSTRUCTION

Community Effects

General Construction Noise

Construction noise is usually considered a temporary phenomenon. Construction of the SSU6 Project is expected to last approximately 19 to 20 months (CEOE 2002a, AFC §§ 1.4, 3.4). Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances. The County General Plan Noise Element restricts general construction work to the hours of 7 a.m. to 7 p.m. on weekdays, and 9 a.m. to 5 p.m. on Saturdays; work on Sundays and holidays is

prohibited. Construction noise is further limited to 75 dB L_{eq} at the nearest receptor. The General Plan Geothermal/Transmission Element sets limits on the noise that can be created by well drilling activities, but allows drilling to progress 24 hours per day.

The applicant has predicted power plant and wellhead construction noise impacts on the nearest (and most impacted) sensitive receptor, the residence at the Wildlife Refuge headquarters (noise measuring location ML-10 on **NOISE Table 4**) (CEOE 2002a, AFC § 5.11.2.2.1; Table 5.11-5).

Power Plant Construction

Power plant construction noise at the residence would vary from 41 to 56 dBA for normal work. (Steam blows and pile driving would be louder; see below). This is considerably quieter than the Noise Element limit of 75 dBA L_{eq} . This equals or may slightly exceed the daytime ambient L_{eq} levels at this residence, which range from 45 to 56 dBA (CEOE 2002a, AFC Table 5.11-2). Such noise levels would be barely noticeable under most conditions.

Well Pad Development

The residence at the Wildlife Refuge headquarters is the nearest sensitive receptor to any well pad; production well pad OB1 lies approximately 2,500 feet SW of this residence. The applicant has predicted the noise that would result from developing the wells at OB1 at 75 to 79 dBA (CEOE 2002a, AFC Table 5.11-5); at the residence, this would attenuate to 46 to 51 dBA. Translating this to a CNEL value yields approximately 58 dBA, which is less than the limit of 60 dBA CNEL established in the General Plan Geothermal/Transmission Element. Since this work would be short term, no significant adverse impact is expected. Should the work, in fact, prove annoying to residents at the Wildlife Refuge headquarters, the noise complaint resolution process encompassed in staff's proposed Condition of Certification **NOISE-2** would be used to deal with the situation.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the steam system, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. High pressure steam is then allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is quite effective at cleaning out the steam system. At the end of this procedure, which would be conducted continuously for approximately 72 hours, the steam line is connected to the steam turbine, which is then ready for operation.

Such steam blows could produce noise as loud as 118 dBA at a distance of 100 feet. In order to reduce disturbance from steam blows, the applicant proposes to equip the

steam blow piping with a silencer that would reduce noise levels by 44 dBA. The applicant has predicted steam blow noise levels at the nearest sensitive receptor of 50 dBA (CEOE 2002a, AFC § 5.11.2.2.1). The ambient L_{90} (background) noise level during the quietest hours of the night averages 36 dBA (see **NOISE Table 4**). The resultant 14 dBA increase due to steam blows would likely be quite annoying to the residents. The applicant therefore proposes to offer to relocate the residents during the three days' duration of the steam blows.

Another concern is steam blow noise impacts on wildlife, specifically protected bird species.² It has been determined that subjecting the Yuma clapper rail to noise levels above 60 dBA during mating or nesting seasons can be detrimental to this bird (see **Biological Resources**). The applicant has specifically acknowledged the need to meet this limit (CEOE 2002a, AFC Table 3.7-1, page 3-64). The predicted steam blow noise level of 50 dBA at the Wildlife Refuge is sufficiently below the threshold level of 60 dBA that no detrimental impacts can be expected.

In order to ensure minimal annoyance due to steam blows, staff proposes Conditions of Certification to limit noise from steam blows by requiring the use of a temporary silencer to achieve the noise level cited above, and to implement a notification process to make neighboring land uses aware of impending steam blows and offer to temporarily relocate them (see proposed Conditions of Certification **NOISE-4** and **NOISE-5** below). This should ensure the process is tolerable to residents and adjacent land uses.

Pile Driving

The applicant predicts that noise from pile driving at the power plant site could reach 71 dBA at the Wildlife Refuge (CEOE 2002a, AFC § 5.11.2.2.1). Pile driving for pipe supports for the brine supply pipeline from well pad OB3 would produce noise impacts at the refuge of 67 dBA (CEOE 2002a, AFC § 5.11.2.6). As discussed above in **Steam Blows**, subjecting the Yuma clapper rail to levels above 60 dBA during the mating or nesting season is not allowable. To avoid unacceptable impacts on this protected species, staff recommends that pile driving be performed using a quieter process, such as vibratory driving, or be avoided during the mating and nesting seasons. To ensure this protection, staff proposes Conditions of Certification **NOISE-4** and **BIO-19** (see **Biological Resources**).

Linear Facilities

New off-site linear facilities would include two electrical interconnection lines to an existing transmission line and an existing substation, piping carrying geothermal brine from the 10 production wells to the power plant, piping conveying spent brine from the power plant to the seven reinjection wells, and a pipeline conveying canal water to the power plant site for use in spent brine dilution and as potable water.

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. To provide reasonable protection from undue noise, the County's General Plan Noise Element

² The Imperial County General Plan Noise Element specifically lists riparian birds as potential sensitive receptors (Imperial 2001, § II.C).

(Imperial 2001) sets a limit for construction noise of 75 dBA (8-hour average) at the nearest sensitive receptor. The Noise Element further restricts construction to certain hours of the day and days of the week; see **NOISE Table 7**.

NOISE Table 7
Restriction of Construction Hours

| Day | Permissible Hours of Construction |
|-----------------------|-----------------------------------|
| Monday – Friday | 7 a.m. to 7 p.m. |
| Saturday | 9 a.m. to 5 p.m. |
| Sunday | Not Allowed |
| Holidays ³ | Not Allowed |

Source: Imperial 2001, § IV.C.3

The sensitive receptor nearest to the geothermal brine pipelines and the canal water supply pipeline is the residence at the Wildlife Refuge headquarters. The applicant predicts that noise from construction of these pipelines will reach only 51 dBA at the residence (CEOE 2002a, AFC §§ 5.11.2.6, 5.11.2.7). This is well within the 75 dBA limit described above, and is not significantly greater than the daytime ambient noise level of 45 to 56 dBA at the residence. In addition, the applicant proposes to work on these linears only during daytime hours. Staff believes that construction of these linears is unlikely to produce significant noise impacts, and proposes Condition of Certification **NOISE-8** to ensure compliance with these limits.

The electrical transmission interconnection lines would pass near several residences. The IID Midway line would pass within one-half mile of residences along Hooper Road; noise impacts at these residences would range from 35 to 55 dBA, well below the 75 dBA limit specified in the County's Noise Element. The L-Line interconnection line would be routed within 150 feet of several residences along Lack and Bannister Roads, potentially producing intermittent noise levels at these residences from 60 to 80 dBA. Averaged over eight hours, this noise would be less than the 75 dBA limit in the Noise Element, and construction on the line would be limited to daytime hours. Staff believes that these short-term noise impacts will be tolerable to residents, and are thus less than significant. Adoption of staff's proposed Condition of Certification **NOISE-8** would ensure adherence to the above limits.

Vibration

The only construction operation likely to produce vibration that could be perceived off-site would be pile driving. The distance to the nearest sensitive receptor, the residence at the Wildlife Refuge, is nearly half a mile. This is sufficient to ensure that pile driving vibration will be insignificant, if not imperceptible.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards, and has recognized those applicable LORS that would protect construction workers (CEOE 2002a, AFC § 5.11.2.2.2) To ensure that construction workers are, in

³ Holidays are defined as: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, Thanksgiving Day and the day after, and December 25th.

fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-3**.

PROJECT SPECIFIC IMPACTS — OPERATION

Community Effects

Power plant noise is unique. A power plant operates as essentially a steady, continuous noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. Nighttime ambient noise levels are typically lower than the daytime levels; differences in background noise levels of 5 to 10 dBA are common. Staff believes it is prudent to consider the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's projected noise level. This assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep.

In addition, staff analyzes compliance of the projected project noise with applicable LORS, in this case, the Imperial County General Plan and Noise Ordinance.

Power Plant Operation

During its operating life, the SSU6 Project would represent essentially a steady, continuous noise source day and night. Occasional brief increases in noise levels would occur as steam relief valves open to vent pressure, or during startup or shutdown as the plant transitions to and from steady-state operation. At other times, such as when the plant would be shut down for lack of dispatch or for maintenance, noise levels would decrease.

The primary noise sources of the project will include the steam turbine generator, the evaporative cooling towers, and, occasionally, the emergency diesel generators. The noise emanating from a power plant during normal operation is generally broadband, steady state in nature.

The applicant performed acoustical calculations to determine the project's noise impacts on sensitive receptors, and to identify any necessary mitigation measures. Calculations were based on typical manufacturer noise data for the major equipment (CEOE 2002a, AFC, § 5.11.2.2.2 and Table 5.11-4). Power plant noise at the residence at the Wildlife Refuge headquarters would not exceed 39 dBA L_{eq} . This represents an increase of only 4 dBA above the lowest measured hourly background noise level at the residence of 34.9 dBA L_{90} , a barely perceptible increase unlikely to draw complaints from residents.

For a continuous noise source such as a power plant, 39 dBA L_{eq} is equivalent to 45 dBA CNEL, significantly less than the 60 dBA considered in the Noise Element Noise/Land Use Compatibility Guidelines for residential areas (Imperial 2001, Table 7), and thus in compliance with this LORS. This level is also significantly less than the nighttime residential property line noise limit of 45 dBA specified both in the Noise Element (Imperial 2001, Table 9) and in the County's Noise Ordinance (Imperial 1998, § 90702.00), thus complying with these LORS.

The applicant commits to installing the emergency diesel generators in an acoustical enclosure that will control noise emanations to 70 dBA at a distance of 50 feet (CEOE 2002a, AFC § 5.11.2.2.2). This should result in noise levels at the residence of approximately 38 dBA, an inaudible level.

To ensure that the plant would not exceed these projected noise levels at any sensitive receptor, staff has proposed Condition of Certification **NOISE-6**.

Tonal and Intermittent Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. Intermittent noises would include machinery whine, and steam relief valves venting during startup, shutdown or unplanned unit trips. To ensure that the plant is designed and constructed to produce no annoying tonal noises, staff proposes Condition of Certification **NOISE-6**.

Linear Facilities

All water and brine piping will be effectively silent during operation. Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line, and will thus be inaudible to any receptors. Noise from the brine production wellheads, caused by fluid flow through the wellhead valves, will not exceed 25 dBA at the residence at the Wildlife Refuge headquarters (CEOE 2002a, AFC § 5.11.2.5); this would be inaudible.

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration), and through the air (airborne vibration).

The operating components of a geothermal power plant consist of a high-speed steam turbine, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permissible vibration levels are typically on the order of 0.06 inches/second. The applicant calculates that, given normal attenuation through the soil, any equipment vibration would be imperceptible at a distance of 300 feet from the plant (CEOE 2002a, AFC § 5.11.2.2.2). Energy Commission staff agrees with this estimate, and agrees with the applicant that groundborne vibration from the SSU6 Project will be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves, and can rattle the walls of lightweight structures. The applicant predicts that the SSU6 Project's airborne vibration would be imperceptible at a distance of 1,000 feet from the

plant (CEOE 2002a, AFC § 5.11.2.2.2). There would thus be no impact at any likely receptor.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards, and has committed to comply with applicable LORS (CEOE 2002a, AFC §§ 5.11.2.2.2). The applicant would implement a comprehensive hearing conservation program in accordance with OSHA and Cal-OSHA LORS. To ensure that plant operating and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-7**.

CUMULATIVE IMPACTS

Section 15130 of the CEQA Guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

Pursuant to CEQA, a cumulative impacts analysis can be performed by either 1) summarizing growth projections in an adopted general plan or in a prior certified environmental document, or 2) compiling a list of past, present, and probable future projects producing related or cumulative impacts. The second method has been utilized for the purposes of this Staff Assessment.

The applicant has identified three nearby projects as potential contributors to cumulative noise impacts:

- the State Route 78/111 Expressway Project (Brawley Bypass);
- the Solar Evaporation Pond Pilot Project; and
- work performed under the IID Water Conservation and Transfer Project/Habitat Conservation Plan.

Because of the significant distances between the SSU6 Project and these other projects, and the distances to the sensitive receptor, staff believes that no cumulative noise impacts are possible.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed SSU6 Project (please refer to **Socioeconomics Figure 1** in this document), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on this **Noise and Vibration** analysis, staff has identified no significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no Noise and Vibration environmental justice issues related to this project.

FACILITY CLOSURE

In the future, upon closure of the SSU6 Project, all operational noise from the project would cease, and no further adverse noise impacts from operation of the project would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction of the project, it can be treated similarly. That is, noisy work could be performed during daytime hours. Any noise LORS that were in existence at that time would apply. Applicable Conditions of Certification included in the Energy Commission Decision would also apply unless modified.

CONCLUSIONS AND RECOMMENDATIONS

Energy Commission staff concludes that the SSU6 Project, constructed and operated as proposed by the applicant, can be built to comply with all applicable noise laws, ordinances, regulations and standards. Staff further concludes that if the SSU6 Project is built as described above, and if pile driving is performed as required in proposed Condition of Certification **NOISE-4**, it is not expected to produce significant adverse noise impacts. Analysis further shows that there will be no cumulative impacts with another project, and no significant direct or cumulative noise impacts to an environmental justice population.

To ensure compliance with all applicable noise LORS and mitigation of noise impacts to less than significant levels, staff recommends adoption of the following Conditions of Certification.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one-half mile of the site and the linear facilities, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement, signed by the project manager, stating that the above notification has been performed, and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- If the noise is project related, take all feasible measures to reduce the noise at its source; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form, with the local jurisdiction and the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 3-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program. The project owner shall make the program available to OSHA and Cal-OSHA upon request.

STEAM BLOW AND PILE DRIVING MANAGEMENT

NOISE-4 The project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 74 dBA measured at a distance of 100 feet. The project owner may conduct steam blows continuously, 24 hours per day, until completed.

The project owner shall utilize quiet pile driving techniques, such that noise from this operation, measured at the residence at the headquarters facility of the Sonny Bono National Wildlife Refuge, does not exceed 60 dBA L_{eq} . Alternatively, the project owner may schedule pile driving so that it does not occur during the mating season or the nesting season of the Yuma clapper rail.

Verification: At least 15 days prior to the first steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected, and a description of the steam blow schedule.

At least 15 days prior to first pile driving, the project owner shall submit to the CPM a description of the pile driving technique to be employed, including calculations showing its projected noise impacts at the above residence. Alternatively, this submittal may entail a description of the pile driving schedule, demonstrating that it does not coincide with the mating season or the nesting season of the Yuma clapper rail.

STEAM BLOW NOTIFICATION

NOISE-5 Prior to the first steam blow, the project owner shall notify the occupants of the residence at the Sonny Bono National Wildlife Refuge headquarters facility. The project owner shall offer to temporarily relocate the occupants of that residence for the duration of the steam blows, and shall perform this relocation upon their acceptance.

The notification may be in the form of a letter to the residence, a telephone call, a flier or other effective means. The notification shall include a description of the purpose and nature of the steam blow, the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

Verification: The project owner shall notify the occupants of the residence at the Sonny Bono National Wildlife Refuge headquarters facility at least 15 days prior to the first steam blow, and extend the offer to temporarily relocate them. Within five days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification. This letter shall also include evidence of an offer to temporarily relocate the residents of the residence described above, and evidence of their acceptance or refusal.

NOISE RESTRICTIONS

NOISE-6 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due to plant operation to exceed 39 dBA L_{eq} measured at the residence at the Sonny Bono National Wildlife Refuge headquarters.

No new pure-tone components may be introduced. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. Steam relief valves shall be adequately muffled to preclude noise that draws legitimate complaints.

- A. When the project first achieves a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at the monitoring site near the residence at the Sonny Bono National Wildlife Refuge headquarters. This survey during power plant operation shall also include measurement of one-third octave band sound pressure levels at

each of the above locations to ensure that no new pure-tone noise components have been introduced.

- B. If the results from the noise survey indicate that the power plant noise level (L_{eq}) at the affected receptor exceeds the above value for any given hour during the 25-hour period, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.
- C. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the Imperial County Planning Department, and to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-7 Following the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-8 Heavy equipment operation and noisy construction work relating to any project features that lie within 300 feet of residentially zoned property shall be restricted to the times of day delineated below:

| | |
|-----------------------|------------------|
| Monday through Friday | 7 a.m. to 7 p.m. |
| Saturday | 9 a.m. to 5 p.m. |
| Sunday and Holidays | Not allowed |

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

| | | |
|---|-----|-----------------|
| Salton Sea Unit 6 Project (02-AFC-2) | | |
| NOISE COMPLAINT LOG NUMBER _____ | | |
| Complainant's name and address: | | |
| Phone number: _____ | | |
| Date complaint received: _____ | | |
| Time complaint received: _____ | | |
| Nature of noise complaint: | | |
| Definition of problem after investigation by plant personnel: | | |
| Date complainant first contacted: _____ | | |
| Initial noise levels at 3 feet from noise source _____ | dBA | Date: _____ |
| Initial noise levels at complainant's property: _____ | dBA | Date: _____ |
| Final noise levels at 3 feet from noise source: _____ | dBA | Date: _____ |
| Final noise levels at complainant's property: _____ | dBA | Date: _____ |
| Description of corrective measures taken: | | |
| Complainant's signature: _____ | | Date: _____ |
| Approximate installed cost of corrective measures: \$ _____ | | |
| Date installation completed: _____ | | |
| Date first letter sent to complainant: _____ | | (copy attached) |
| Date final letter sent to complainant: _____ | | (copy attached) |
| This information is certified to be correct: | | |
| Plant Manager's Signature: _____ | | |

(Attach additional pages and supporting documentation, as required).

REFERENCES

CEOE (CE Obsidian Energy LLC). 2002 a. Application for Certification, Salton Sea Unit 6 Project (02-AFC-2). Submitted to the California Energy Commission, July 29, 2002.

Imperial (Imperial County Building/Planning Department). 1998. Land Use Ordinance, Title 9, Division 7: Noise Abatement and Control, November 24, 1998.

Imperial (Imperial County Building/Planning Department). 2001. General Plan Noise Element, 2001.

NOISE APPENDIX A

FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

Noise Table A1
Definition of Some Technical Terms Related to Noise

| Terms | Definitions |
|---|---|
| Decibel, dB | A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter). |
| Frequency, Hz | The number of complete pressure fluctuations per second above and below atmospheric pressure. |
| A-Weighted Sound Level, dBA | The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted. |
| L ₁₀ , L ₅₀ , & L ₉₀ | The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L ₉₀ is generally taken as the background noise level. |
| Equivalent Noise Level, L _{eq} | The energy average A-weighted noise level during the Noise Level measurement period. |
| Community Noise Equivalent Level, CNEL | The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m. |
| Day-Night Level, L _{dn} or DNL | The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m. |
| Ambient Noise Level | The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location. |
| Intrusive Noise | That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level. |
| Pure Tone | A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz. |

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

| Noise Table A2 Typical Environmental and Industry Sound Levels | | | |
|---|--|---|-----------------------|
| Noise Source (at distance) | A-Weighted Sound Level in Decibels (dBA) | Noise Environment | Subjective Impression |
| Civil Defense Siren (100') | 140-130 | | Pain Threshold |
| Jet Takeoff (200') | 120 | | Very Loud |
| Very Loud Music | 110 | Rock Music Concert | |
| Pile Driver (50') | 100 | | |
| Ambulance Siren (100') | 90 | Boiler Room | |
| Freight Cars (50') | 85 | | |
| Pneumatic Drill (50') | 80 | Printing Press Kitchen with Garbage Disposal Running | Loud |
| Freeway (100') | 70 | | Moderately Loud |
| Vacuum Cleaner (100') | 60 | Data Processing Center Department Store/Office | |
| Light Traffic (100') | 50 | Private Business Office | |
| Large Transformer (200') | 40 | | Quiet |
| Soft Whisper (5') | 30 | Quiet Bedroom | |
| | 20 | Recording Studio | |
| | 10 | | Threshold of Hearing |

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970)

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

| Noise Table A3 Addition of Decibel Values | |
|--|--|
| When two decibel values differ by: | Add the following amount to the larger value |
| 0 to 1 dB | 3 dB |
| 2 to 3 dB | 2 dB |
| 4 to 9 dB | 1 dB |
| 10 dB or more | 0 |
| Figures in this table are accurate to ± 1 dB. | |

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source ten times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

Noise Table A4
OSHA Worker Noise Exposure Standards

| Duration of Noise (Hrs/day) | A-Weighted Noise Level (dBA) |
|--------------------------------|---------------------------------|
| 8.0 | 90 |
| 6.0 | 92 |
| 4.0 | 95 |
| 3.0 | 97 |
| 2.0 | 100 |
| 1.5 | 102 |
| 1.0 | 105 |
| 0.5 | 110 |
| 0.25 | 115 |

Source: 29 C.F.R. § 1910.95

[Insert **NOISE Figure 1** here; use AFC Figure 8.7-1]

PUBLIC HEALTH

Ramesh Sundareswaran

INTRODUCTION

The purpose of this analysis is to determine if toxic air contaminants from the proposed Salton Sea Unit 6 Power Plant Project (SSU6) will have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

Staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this Preliminary Staff Assessment (PSA). Impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams are discussed in the **Soil and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

The following sections describe staff's method of analyzing potential health impacts and the criteria used to determine their significance.

METHOD OF ANALYSIS

Staff's analysis addresses toxic air contaminants to which the public could be exposed during the SSU6 Project's construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal (skin) contact, or ingestion via contaminated food or water.

Air pollutants or contaminants for which no air quality standards have been set are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a four-step process known as health risk assessment is used to estimate the increased risk of health problems in people who are exposed to different amounts of the pollutants. The risk assessment procedure consists of the following steps:

1. identify the types and amounts of hazardous substances that the SSU6 could emit to the environment;
2. estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
3. estimate amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and
4. characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks, which are estimated by the screening level assessment. This is accomplished by examining conditions that would lead to the highest, or worst-case risks, and then using those in the study. Such conditions include:

- using the highest levels of pollutants that could be emitted from the plant;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer model which predicts the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are calculated (predicted) to be the highest;
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses); and
- assuming that an individual's exposure to all pollutants occurs for 70 years.

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances which could present a health hazard from noninhalation pathways of exposure (see CAPCOA 1993, Table III-5). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (1-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those which arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from ten to one hundred percent of a lifetime (from seven to seventy years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs. These are amounts of toxic substances to which even sensitive people can be exposed for a lifetime and suffer no adverse health effects (CAPCOA 1993, p. III-36). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease that makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature, and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available when the standard was developed and is meant to provide a reasonable degree of protection against hazards

that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformance with California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (CAPCOA 1993, p. III-37). In those cases where the actions may be synergistic (where the effects are greater than the sum), this approach may underestimate the health impact.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions. In reality, the risk is generally too small to actually be measured. For example, the one in one million risk level represents a one in one million increase in the normal risk of developing cancer over a lifetime, at whatever location is estimated to have the worst-case risk.

Cancer risk is expressed in chances per million, and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called “potency factors,” and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks are likely to be lower, or even considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

SIGNIFICANCE CRITERIA

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a hypothetical person who lives in the place where the highest air concentration of chemicals is located. Staff estimates how much exposure this individual has by making “worst-case” assumptions about how this person lives and works. By estimating exposure to this individual, it can be determined if there is any potential for health concerns.

As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. Significance of project health impacts is determined separately for each of the three categories.

Acute and Chronic Non-cancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a “hazard index”. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance, which has the same type of health effect, is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that cumulative worst-case exposures are less than the reference exposure levels (safe levels). Under these conditions, health protection is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant non-cancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, § 25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations, § 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure”. This level of risk is equivalent to a cancer risk of ten in one million, or 10×10^{-6} . An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that which applies to Proposition 65.

The significant risk level of ten in one million is consistent with the level of significance adopted by the various Air Boards in California pursuant to Health and Safety Code section 44362(b), which requires notification of nearby residents when an air district determines that there is a significant health risk from a facility.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. When a screening analysis shows cancer risks above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. If facility risk, based on refined assumptions, exceeds the significance level of ten in one million, staff would require appropriate measures to reduce risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than ten in one million, staff would deem such risk to be significant, and would not recommend project approval.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

Clean Air Act section 112 (42 U.S. Code section 7412)

Section 112 requires new sources, which emit more than ten tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).

STATE

California Health and Safety Code sections 39650 et seq.

These sections mandate the California Air Resources Board (CARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also require that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.

California Health and Safety Code section 41700

This section states that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property “.

LOCAL

Imperial County Air Pollution Control District (ICAPCD) rules 216, 1001, 1002, 1003 pertain to the regulations concerning implementation of New Source Review, NESHAP, California Airborne Toxic Control and limitations of hexavalent chromium from cooling towers.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project’s potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The proposed site is located on approximately 80 acres of a 160-acre parcel in the unincorporated area of Imperial County. The site lies west of State Highway 111 and north of State Highway 86. It will be within the block bounded by McKendry Road on the north, Boyle Road on the east, Severe Road on the west, and Peterson Road to the south. The entire parcel is being used for row crops currently. The site is at an elevation of approximately 230 feet below sea level with terrain that rises slightly away from the site.

The project area is designated as Heavy Agriculture, Geothermal Overlay Zone in the Imperial County General Plan. Existing land uses surrounding the site include agriculture, open space, industrial and residential.

The nearest residence is about 3,700 feet northeast of the project site. The next closest residence is about 2 miles to the east. As mentioned above, the location of sensitive receptors near the proposed site is an important factor in considering potential public health impacts. No schools, day care facilities, convalescent homes, or hospitals exist within a 3-mile radius of the site. There are, however, five residences within a 3-mile radius of the site.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

Imperial County has a distinct desert climate, which is reflected by low rainfall, hot summers, mild winters, low humidity and robust temperature inversions. In the summertime, temperatures may reach 106 degrees F. Daytime winter temperatures are milder, around 70 degrees F. Wind direction is predominately from the west to east throughout the year. It does, however, shift with a southeast component during the fall season.

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of Imperial County Air Pollution Control District. By examining average toxic concentration levels from representative air monitoring sites in California with cancer risk factors specific to each contaminant, lifetime cancer risk can usually be calculated to provide a background risk level for inhalation of ambient air. However, the ICAPCD does not appear to have a program to

measure levels of toxic air contaminants at such monitoring sites. The air monitoring station closest to the SSU6 project is in Niland, approximately 5 miles northeast of the project site, but only measures criteria pollutants. Consequently, background cancer risk levels at the station are currently unavailable. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual is about 1 in 4, or 250,000 in one million.

SITE CONTAMINATION

Site disturbances will occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances.

On behalf of CEOE, a Phase I Environmental Site Assessment (ESA) was conducted by URS Corporation in accordance with American Society for Testing and Materials Standard E 1527-00, Standard Practice for Environmental Site Assessments (CEOE 2002a, Appendix O). The purpose of an ESA is to determine the potential for the presence or likely presence of any hazardous substances or petroleum products under conditions that may indicate a release or threat of a release from present or past activities. The results of the ESA are summarized in staff's **Waste Management** section.

IMPACTS

CONSTRUCTION

Emissions Sources

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as from heavy equipment operation both during site preparation and well drilling, and well flow testing. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis. AFC table 5.1-21 refers to criteria emissions and table 5.1-20 refers to the noncriteria pollutants anticipated during the construction of the SSU6 project. Section 5.1.2.2 of the AFC provides a detailed discussion of the emission sources during construction of the SSU6 project.

As described in the **Waste Management** section, a Phase I Environmental Site Assessment (ESA) has been performed. Additional information is currently being sought from the Applicant to confirm the presence of any onsite significant contamination.

The operation of off-road construction equipment will result in air emissions from diesel-fueled engines. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances.

Diesel exhaust contains over 40 substances that are listed by the U.S. EPA as hazardous air pollutants and by the Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust causes both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel on Toxic Air Contaminants (SRP) recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of $5 \mu\text{g}/\text{m}^3$ and a cancer unit risk factor of $3 \times 10^{-4} (\mu\text{g}/\text{m}^3)^{-1}$ (SRP 1998, p. 6). The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, the ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the SSU6 is anticipated to take place over a period of twenty months. As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from seven to seventy years. However, the risk of cancer is proportional to the length of exposure and can be calculated by adjusting for the relatively short construction period. This risk is presented below.

AFC Section 5.15.2.1.2 and Appendix G present estimates of diesel exhaust emissions from construction activities. The two contributory sources of diesel are the plant construction equipment and well drilling (CEOE 2002a). Equipment that can be expected to generate diesel emissions includes drill rigs, cranes, trucks, graders, generators, welding equipment, compressors and water pumps. The maximum annual sum of these two categories results in an impact exposure of 0.35 micrograms per cubic meters, north and east of the site. The lifetime cancer risk per individual based on this exposure and a diesel particulate unit risk factor of $3.0 \text{ E-}4$ is estimated to be 2.5 in one million (CEOE 2002I). The conservative nature of the screening assumptions used means that the estimated risk is overstated and the actual cancer risks are likely to be lower or even considerably lower than the estimate.

In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, staff recommends the use of ultra low sulfur diesel fuel and the installation of soot filters on diesel equipment. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85-92 percent. Such filters will reduce diesel emissions during construction and reduce any potential for significant health impacts. These mitigation measures are required by Conditions of Certification in the **Air Quality** section of this PSA.

OPERATION

Emissions Sources

Sources of air emissions at the SSU6 plant include cooling towers, steam vent tanks, emergency generators, fire pumps, filter cakes, miscellaneous operation and maintenance equipment and steam blow lines. Most of the emissions are expected from the cooling towers and are to be emitted as offgases, drift and dispersed noncondensable gases. AFC section 5.1.2.3 provides a detailed discussion of the various emission sources.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Table 5.15-8 of the AFC lists non-criteria pollutants that may be emitted from the project along with their anticipated amounts. Pollutants include but are not limited to ammonia, arsenic, benzene, ethylbenzene, hydrogen sulfide, mercury, radon, diesel particulates and xylenes. Table 5.15-3 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include reference exposure levels, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the CAPCOA Guidelines (CAPCOA 1993).

Public Health Table 1 lists toxic emissions and shows how each contributes to the health risk analysis. For example, the first row shows that ammonia is not a carcinogen, but if inhaled, may have chronic (long-term) noncancer health effects and acute (short-term) noncancer effects.

Public Health Table 1
Types of Health Impacts Attributed to Toxic Emissions

| Substance | Cancer | Noncancer (Chronic) | Noncancer (Acute) |
|------------------|--------|------------------------|----------------------|
| Ammonia | | ✓ | ✓ |
| Arsenic | ✓ | ✓ | ✓ |
| Benzene | ✓ | ✓ | ✓ |
| Beryllium | ✓ | ✓ | |
| Cadmium | ✓ | ✓ | |
| Chromium | ✓ | ✓ | |
| Copper | | ✓ | ✓ |
| Ethylbenzene | | ✓ | |
| Hydrogen sulfide | | ✓ | ✓ |
| Lead | ✓ | ✓ | |
| Mercury | | ✓ | ✓ |
| Manganese | | ✓ | |
| Nickel | ✓ | ✓ | ✓ |
| Diesel-PM10 | ✓ | ✓ | |
| Selenium | | ✓ | |
| Radon | ✓ | | |
| Toluene | | ✓ | ✓ |
| Xylene | | ✓ | ✓ |
| Zinc | | ✓ | |

Source: AFC Table 5.15-2 using reference exposure levels and cancer unit risks from CAPCOA Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines, October 1993 and SRP 1998.

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a “worst case” analysis. Maximum hourly emissions are required to calculate acute (one hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

AFC Tables 5.15-8 and 5.15-9 show annual and maximum hourly emissions for the routine operations of the SSU6 project.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The screening analysis was performed using the U.S. EPA approved ISCST3 dispersion modeling program and the ACE 2588 model. The ACE 2588 model uses ISCST3 output in conjunction with source emission rates and toxicity factors, to estimate human

health effects. This method of assessing health effects is consistent with the California Air Pollution Control Officers Association (CAPCOA) Air Toxics “Hot Spot” Program Revised 1992 Risk Assessment Guidelines (October 1993) referred to earlier, and results in the following health risk estimates.

Impacts

The screening health risk assessment for the project resulted in a maximum acute hazard index of 0.881 at the eastern boundary of the SSU6 facility (the point of maximum impact, or PMI). The maximum acute hazard index at a sensitive receptor (the maximum exposed individual, or MEI) is 0.310. The chronic hazard index at the PMI is 0.156. The maximum chronic hazard index to occur at the MEI is 0.0604. As **Public Health Table 2** shows, both acute and chronic hazard indices are under the REL of 1.0, indicating that no short- or long-term adverse health effects are expected.

Cancer Risk

As shown in **Public Health Table 2**, the maximum incremental lifetime cancer risk (PMI) was estimated to be 2.88 in one million, approximately 0.3 miles east of the SSU6 project site. The total worst case individual cancer risk (MEI) is calculated to be 1.07 in one million at a location approximately 2 miles east of the project site.

**Public Health Table 2
Operation Hazard/Risk**

| Type of Hazard/Risk | Hazard Index/Risk | Significance Level | Significant? |
|----------------------------|--------------------------|---------------------------|---------------------|
| ACUTE NONCANCER | 0.881 | 1.0 | No |
| CHRONIC NONCANCER | 0.156 | 1.0 | No |
| INDIVIDUAL CANCER | 2.88×10^{-6} | 10.0×10^{-6} | No |

Source: CEOE 2002a, Section 5.15.2.1.4

Cooling Tower

In addition to toxic air contaminants, the possibility (however remote) exists for bacterial growth to occur in the cooling tower, including Legionella. Legionella is a type of bacteria that grows in water (optimal temperature of 37° C) and causes Legionellosis, otherwise known as Legionnaires’ disease. Untreated or inadequately treated cooling systems in the United States have been correlated with outbreaks of Legionellosis. These outbreaks are usually associated with building heating, ventilating, and air conditioning (HVAC) systems but it is possible for growth to occur in industrial cooling towers. In fact, Legionella bacteria have been found in drift droplets. The U.S. Environmental Protection Agency (U.S. EPA) published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella survival is enhanced by symbiotic relationships with other microorganisms, particularly in biofilms and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. Numerous outbreaks of Legionellosis have been linked to cooling towers and evaporative condensers in hospitals, hotels, and public buildings, clearly establishing these water sources as habitats for Legionella. Kool et al (2000) found that Legionella was detected in water

systems of 11 of 12 hospitals in San Antonio, Texas. Interestingly, the number of legionnaires' disease cases in each hospital correlated better with the proportion of water-system sites that tested positive for Legionella ($p=0.07$) than with the concentration of Legionella bacteria in water systems ($p=0.23$). According to the EPA, in most cases, disease outbreaks resulting from Legionella aerosolizations have involved indoor exposure or outdoor exposure within 200 meters of the source. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

The U.S. EPA also published a Legionella Drinking Water Health Advisory (EPA 2001) noting that there are several control methods for disinfecting water in cooling systems, including thermal (super heat and flush), hyperchlorination, copper-silver ionization, ultraviolet light sterilization, ozonation, and instantaneous steam heating systems

One technical paper (Addiss, David, et al. 1989) describes cases of Legionnaires' Disease due to cooling tower drift in a town in Wisconsin in the summer of 1986. The authors noted that of five cooling towers in the area, the tower associated with the Legionnaires' disease was the only one that did not use chemical biocides. Furthermore, the cooling tower was "old" (built before 1986) and the water temperature was 41°C, which is in the middle of the "active growth" range of 25-55°C for Legionella. There were no problems caused by the other four cooling towers, which treated their cooling water. Another technical paper (Bhopal, R.S., et al. 1991) addressed the relative risk of contracting Legionnaires' Disease when living in the proximity of cooling towers. The relative risk of 3.0 within 0.5 Km of the cooling tower drops to a risk of 1.19 at distances of 0.5-0.75 Km of the cooling tower. Placed into context of the proposed SSU6 project, the distance to the nearest residential receptor is about 3700 feet. In conclusion, these two articles provide evidence that older cooling towers with untreated water can be a source of Legionella, but that if chemical biocides are used or residences are located further than approximately 2500 feet away, the risks of contracting Legionnaires' disease would be very low.

A paper presented at the 1978 annual meeting of the Cooling Technology Institute (CTI) notes that aerosol particles or droplets larger than 600 micrometers would be expected to fall to the surface within a few hundred meters of the cooling tower (Adams, Paul A. and Lewis, Barbara 1978). Drift eliminators would remove these larger aerosol particles down to a size of about 100 - 200 micrometers. These small particles may be expected to travel long distances downwind in the diffusing cooling tower plume. Bacterial aerosol concentrations in the vicinity of and downwind of cooling towers are affected by: quality of makeup water, type of biofouling control, effect of biological oxygen demand (BOD) in makeup water, wind speed, height of tower, speed and efficiency of the vent fans, stability of the atmosphere and temperature differential between exit and ambient air. The potential public health hazard from microbial aerosols within a cooling tower plume is difficult to estimate.

Another paper presented at the 1982 CTI annual meeting (Tyndall R.L. 1982) discussed the profiles and infectivity of Legionella bacteria populations in cooling towers. A survey

of both industrial and air conditioning cooling towers was conducted for the presence of this bacterium which showed that while the majority of cooling water tested contained more than 10,000 bacteria per liter of water, chlorine can be effective in controlling Legionella concentrations in some cooling towers. The authors concluded that generalizations concerning the content and serotypic profiles of Legionella in cooling towers at any given site cannot be made and that each cooling tower needs to be individually assessed. It also appears that some biocides routinely used to control bacteria in cooling tower waters are not always effective against Legionella.

In 2000, the CTI issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60 percent of industrial cooling towers tested were found to contain Legionella. It estimated that more than 4,000 deaths per year are believed to occur from Legionellosis (from all sources, not limited to industrial cooling towers), but only about 1,000 are reported. The CTI listed no reference or supportive data for this assertion, however. It also noted that continuous chlorine- or bromine-based biocide free residuals of 0.5 to 1.0 ppm in the cooling tower hot return water have been recommended by many agencies and that biocides and biocleaners may aid in the penetration, removal, and dispersion of the biofilm which often builds up on the inside of pipes. Furthermore, the use of these dispersants and detergents often increases the efficacy of the biocide.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process loads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Nalepa, et al (2002) researched the effectiveness of bromine-based biocides on microbial biofilms and biofilm-associated Legionella Pneumophila. Biofilms in cooling systems contribute to a reduction in heat transfer, increase in energy consumption, increase in corrosion, and an increase in health risk. The authors noted that world-wide, deadly outbreaks of Legionnaires' disease continue to take place with regularity despite a growing list of published guidelines and recommended practices by CTI and other industry groups and governmental agencies. The results of studies indicate that the bromine-based biocides may be more effective than chlorine-based biocides against aged, more-difficult to kill biofilms. However, the authors concluded that when properly applied, oxidizing biocides can be part of an overall water treatment program that incorporates effective microbiological control, scale, and corrosion inhibition strategies together with regular maintenance practices.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

In summary, the scientific and technical trade literature are replete with examples of Legionella bacterium present in industrial cooling towers, other building HVAC systems, and indeed, surface waters throughout the world. Health experts have not found a concentration of this bacterium which would not present some risk of infection to the public, that is, a concentration in water below which would be deemed totally "safe". Evidence supports the fact that despite water temperature and biocide control, a thin "bio-film" can form on the inside walls of piping and serve to protect the bacteria from the biocide and temperature variations. Additional chemical additives, mechanical removal, and/or "back-flushing" of the system can be used to remove this bio-film. Despite these facts, it is clear than outbreaks of Legionnaire's disease caused by Legionella bacteria are rare and are due most likely to sources other than modern industrial cooling towers that utilized biocides and that if biofilm formation is under control, Legionella will be restricted to negligible levels.

The following management strategies are directed at minimizing colonization, amplification within the equipment, or both (ASHRAE 1998 and 2000):

- Avoid piping that is capped and has no flow (dead legs).
- Control input water temperature to avoid temperature ranges where Legionella grow. Keep cold water below 25° C (77° F) and hot water above 55° C (131° F).
- Apply biocides in accordance with label dosages to control growth of other bacteria, algae, and protozoa that may contribute to nutritional needs of Legionella. Rotating biocides and using different control methods is recommended. These include thermal shock, oxidizing biocides, chlorine-based oxidants and ozone treatment.
- Conduct routine periodic "back-flushes" to remove bio-film buildup on the inside walls of the pipes.

In order to ensure that Legionella growth is kept to a minimum, staff has proposed Condition of Certification **Public Health-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance.

CUMULATIVE IMPACTS

The maximum impact location occurs where pollutant concentrations from the SSU6 project would theoretically be the highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, and the increase of 2.88 in one million does not represent any real contribution to the average lifetime cancer risk of 250,000 in one million. Modeled facility-related residential risks are lower at more distant locations, and actual risks are expected to be much lower, since worst-case estimates are based on conservative assumptions, and overstate the true magnitude of the risk expected. Therefore, staff does not consider the incremental impact of the

additional risk posed by the SSU6 Project to be either significant or cumulatively considerable.

The worst-case long-term noncancer health impact from the project (0.156 hazard index) is well below the significance level of 1.0 at the location of maximum impact. Similarly, the worst-case acute health impact of 0.881 is below the significance level of 1.0. At these levels, staff does not expect any cumulative health impacts to be significant. As with cancer risk, acute and long-term hazards would be lower at all other locations and cumulative impacts at other locations would also be less than significant. Even in the unlikely event that worst-case emissions from an existing facility were to coincide both geographically and temporally with SSU6 emissions at the location of maximum impact, the overall health outlook would not change for anyone. Thus, the SSU6 project will not result in any significant cumulative cancer or noncancer health impacts.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed SSU6 project (please refer to **Socioeconomics Figure 1** in this Staff Assessment). Staff also reviewed Census 2000 information that shows the low-income population is less than fifty percent within the same radius.

Based on the **Public Health** analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project and, therefore, there are no public health environmental justice issues related to this project.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the SSU6 Project will be in compliance with all applicable LORS regarding long-term and short-term project impacts.

FACILITY CLOSURE

The scope of staff's public health analysis is limited to routine releases of harmful substances to the environment. During either temporary or permanent facility closure, the major concern would be from accidental or non-routine releases from either hazardous materials or wastes, which may be onsite. These are discussed in the **Hazardous Materials** and **Waste Management** sections, respectively. During temporary closure (periods greater than those required for normal maintenance), it is unlikely that there would be any routine releases of harmful substances to the environment, since the facility would not be operating. For permanent closure, the only routine emissions would be related to facility demolition or dismantling, such as exhaust from heavy equipment or fugitive dust emissions. These would be subject to closure conditions adopted by the Energy Commission once a closure plan is received from the project owner. Please refer to the **General Conditions** section for more details.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the SSU6 project, and does not expect any significant adverse cancer, or short- or long-term noncancer health effects from project emissions. Implementation of staff's proposed Condition of Certification will also ensure that the risk of Legionella growth and dispersion is reduced to less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

Public Health-1 The project owner shall develop and implement a cooling tower Biocide Use, Biofilm Prevention, and Legionella Monitoring Program to ensure that the potential for bacterial growth is kept to an absolute minimum. This Program shall include weekly monitoring of biocide and chemical biofilm prevention agents, periodic maintenance of the cooling water system on a quarterly basis to remove bio-film buildup, and quarterly testing to determine the concentrations of Legionella bacteria in the cooling water,

Verification: At least 60 days prior to the commencement of cooling tower operations, the Biocide Use, Biofilm Prevention, and Legionella Monitoring Program shall be provided to the CPM for review and approval.

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SOCIOECONOMICS

Joseph Diamond, Ph.D.

INTRODUCTION

California Energy Commission (Energy Commission) staff socioeconomic impact analysis evaluates the project induced changes on community services and/or infrastructure and related community issues such as Environmental Justice (EJ) and facility closure. Direct, indirect, induced, and cumulative impacts are also included. Staff discusses the estimated impacts of the construction and operation of the Salton Sea Unit 6 (SSU6) Project on local communities, community resources, and public services, pursuant to Title 14, California Code of Regulations, Section 15131. The SSU6 Project will be constructed, owned, and operated by CE Obsidian Energy (CalEnergy) LLC, a non-recourse affiliate of Mid-American Energy Holdings Company.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

California Government Code, section 65996-65997

As amended by SB 50 (Stats. 1998, ch. 407, Sec. 23), states that public agencies may not impose fees, charges or other financial requirements to offset the cost for school facilities.

DISCUSSION OF SETTING AND IMPACTS

Staff reviewed the SSU6 AFC, Vol. I, July 26, 2002 Socioeconomic section and socioeconomic data responses (CEOE 2002a, e, and n). Based on staff's use of the socioeconomic data provided and referenced from governmental agencies, trade associations and staff's analysis, staff agrees with the AFC's socioeconomic analysis and conclusions.

STUDY AREA

The SSU6 is located south of the Salton Sea in central Imperial County. For a full description of the socioeconomic setting, please refer to Section 5.9.1 (Affected Environment) of the SSU6 AFC. The study area (affected area), is census tract 101 of Imperial County and all large communities within easy commuting distance of the power plant as well as other ancillary facilities: Imperial County and the local area cities of Calipatria, Niland, Westmorland, Brawley, and El Centro. These communities are within a one-hour one-way commute distance of the power plant site an area in which construction and operations workers may live. The applicant and staff utilized the Imperial County labor market area for its evaluation of construction and operation worker availability and community services and infrastructure impacts from construction and operation.

Imperial County was used as the study area in identifying non-fiscal (private sector) benefits from the SSU6. **Socioeconomics Table 1-Available Labor by Skill For Construction**, that follows, shows that the Imperial County has more than adequate

labor supply for the SSU6 project except for plumbers, pipefitters, and steamfitters, and welders, cutters, and laborers for relatively short periods of time (CEOE 2002a).

SOCIOECONOMICS Table 1
Available Labor By Skill For Construction*

| Craft | Total Number of Workers in Imperial County 1999 | Projected Total Number of Workers in Imperial County 2006 | Maximum Number of Workers Needed for the Project | Average Number of Workers Needed for the Project | California OES Code |
|--|--|--|---|---|--------------------------------|
| Maintenance Repairers/ General Utility | 480 | 550 | 62 | 30 | 85132 |
| Carpenters /Millwrights | 210 | 320 | 89 | 58 | 87102 |
| Concrete Finisher | 50 | 80 | 35 | 22 | 87311 |
| Plumbers, Pipefitters, Steamfitters | 80 | 120 | 147 | 70 | 87502 |
| Welders and Cutters | 60 | 70 | 65 | 35 | 93914 |
| Laborers | 290 | 3600 | 69 | 50 | 79041 |
| * Source: California Employment Department. Labor Market Information. 2002. | | | | | |

EMPLOYMENT AND ECONOMY

According to the SSU6 AFC the specific geographic boundaries from which all pertinent crafts will come includes Census tract 101, Imperial County and all large communities within easy commuting distance of the power plant. This area includes El Centro, Calipatria, Brawley, Westmorland, and Niland. The average commute time is defined as distances that involve up to a one-hour, one-way commute for construction and operations employees. However, construction workers generally commute as much as two hours (one-way). This defines the local labor market. Construction workers who live in communities at greater distances than a two-hour one-way commute tend to relocate to the project for the work week, then return on the weekend. Operations workers tend to fall inside a one-hour, one-way commute, and if they fall outside this area they will relocate. These commuting times define local and are not out of the ordinary for local work. The "non-local" workers will be 40 percent for construction and 10 percent for operations.

The Impact Analysis For Planning (IMPLAN) model (an input-output model), used in the AFC by the applicant to estimate employment impacts from the SSU6 Project on the

affected area, is widely used and therefore acceptable to staff. The University of California at Berkeley uses the IMPLAN model for regional economic assessment, and it has been used to assess other generating projects in California and the U.S. It is a common regional economic tool. In general, most multipliers are estimated by showing the total change divided by the initial change. Employment multipliers refer to the total additional employment stimulated by the new economic activity. IMPLAN is a disaggregated type of model that divides the (regional) economy into sectors and provides a multiplier for each sector (Lewis et al. 1979). Social Accounting Matrix (SAM)¹ multipliers were used for the applicant's economic impact analysis. SAM multipliers are similar to Type II multipliers because they include both the indirect and induced effect. An IMPLAN SAM variety employment multiplier of 3.1 was used for construction (e.g., the 265 new construction job's income supports approximately 570 indirect and induced jobs in the regional economy) and an IMPLAN SAM variety employment multiplier of 2.6 was used for operations (approximately 110 indirect and induced jobs in the regional economy). An IMPLAN SAM variety construction income multiplier of 1.6 was used that resulted in a secondary impact of \$16.9 million and a total impact of \$47 million.² Finally, an IMPLAN SAM variety operation income multiplier of 1.6 was used that resulted in a secondary impact of \$3.6 million and a total impact of \$9.5 million (Salton Sea 2002b). These multipliers are within an acceptable range of two to three (Moss et al. 1994).

Project construction (power generation including wells and pipeline and electric power transmission) is expected to occur over a 26-month period. The greatest number of construction workers (peak), estimated to be 467 workers will be needed in the 19th month of construction.

The number of construction workers will range from 7 in the last month of construction to approximately 467 workers in the 19th month of construction. The number of non-local workers needed for power plant construction is estimated to be 40 percent.

During operation of the project, about 69 workers will be needed to maintain and operate the project. These workers will come mainly from the local area.

The total employment, estimated by the applicant, using an IMPLAN SAM multiplier of 3.1 for construction, is the equivalent of 834 jobs (which includes 570 secondary jobs), based on an average of 265 project-related construction jobs. For project operations, an average of 69 jobs with an IMPLAN SAM multiplier of 2.6 for operations results in an equivalent of 179 total jobs, (which includes 110 secondary jobs).

The Imperial County unemployment rate was 21.9 percent in 2000 and forecast to be 37.7 percent in 2004 (CEOE 2002a). The November 2002 preliminary not seasonally adjusted unemployment rate for Imperial County was 20.8 percent (State of California 2002).

¹ Type SAM multipliers capture inter-institutional transfers and account for social security and income tax leakages, institutional savings, and commuting.

² All project construction and operations cost data and economic impact estimates are presented in 2002 dollars (CEOC 2002e).

POPULATION

The project is located in a rural area near nine other geothermal power plants. The 2000 Census shows California with total population of 33,871,648, minority population of 18,054,858 (53.3 percent), and white (non-hispanic) population of 15,816,790 or (46.7 percent). For Imperial County, 2000 Census shows a total population of 142,361, minority 113,593 (79.8 percent), and white population of (non-Hispanic) 28,768 or 20.2 percent. The SSU6 AFC reports that the Imperial County Census Tract 101 in the 2000 Census had 9,586 persons. There are no known residential communities within 6 miles of the site and the closest residence is 0.75 miles from the power plant site. As mentioned under the **Employment** section, the majority of construction and operation labor will be local so there would be little induced population growth from the SSU6 project. Furthermore, there would be no displacement of population by the SSU6 project.

The non-local construction workforce (approximately 40 percent of the total construction workforce) would be distributed in Imperial County in the following manner:

- 50 percent in El Centro with 2000 Census population of 37,835 (30 miles from the project site) and Brawley 2000 Census population of 22,052 (17 miles from the project site) and other areas south of the site.
- 25 percent in Calipatria 2000, Census population of 7,289 (60 miles from the project site), and other areas east of the site.
- 25 percent from Niland (7 miles from the project site) and other areas north of the site.

No analytical technique (e.g., a gravity model) was used to estimate the data. Staff agrees with the applicant that construction workers will likely not relocate their families for the duration of the project since construction jobs are seasonal and/or short-term (CEOE 2002n).

About 90 percent of the operational workers are expected to come from the above cities in Imperial County and 10 percent are expected to commute from Indio (1 hour and 20 minutes one way from the project site) or La Quinta (1 hour and 30 minutes one-way from the project site) in nearby Riverside County (CEOE 2002n).

Generally, construction workers commute as much as two hours one-way. Construction workers who live in communities at greater distances than a two hour one-way commute tend to relocate to the project for the workweek, then return on the weekend or bring their families when they relocate (which appears not to be the case for this project). Operation workers tend to fall inside a one hour, one-way commute, and if they fall outside this area they will relocate. Generally, this is consistent with the data presented. However, staff finds it acceptable that operation workers may commute a somewhat longer distance from Indio or La Quinta. If they choose to relocate, adequate housing is available within 10 miles of the project area (CEOE 2002n). Also, seven non-local operation workers (and their families) 10 percent of the total operations workforce, is a very small number.

HOUSING

According to federal standards, permanent housing is considered to be in short supply if the vacancy rate is less than five percent (URS 2000). As of 1998 (see Table 5.9-5 of the SSU6 AFC), there were approximately 43,891 housing units in unincorporated Imperial County and an additional 20,929 housing units in the incorporated communities in the study area. The vacancy rate for this housing averages approximately 5.9 to 7.1 percent for permanent and rental housing. There are 960 hotel/motel rooms and suites in the study area community, but no information was available on vacancy rates. The housing units available to non-local construction workers (approximately 106) for this project are sufficient for worker needs. The majority of the construction workforce and most of the operations work force is expected to be drawn from the local labor force.

The SSU6 project will be located in unincorporated Imperial County in a low population density area with no displacement of housing. The **Population** section notes the closest residences and residential community.

FISCAL

The SSU6 Project is 185 MWs with total project costs of \$460 million. The capital costs of the project are from \$255 to \$405 million. The local capital cost of constructing the project (equipment and materials) is estimated to \$100 million. This would generate about \$7.75 million in local sales tax revenues, some of which would be returned to the County and, the study area communities. The sales tax rate of 7.75 percent is comprised of the state sales tax rate (6.0 percent), the local sales tax rate (1.25 percent), and the district sales tax rate (0.5 percent for the Imperial County Local Transportation Authority). Approximately \$30 million will be expended on construction related payroll.

The total payroll for the operation phase is estimated to be \$5.9 million annually. The applicant anticipates that approximately \$17 million in non-labor purchases (equipment and materials) would occur in the local area. The associated increase in annual sales tax revenues would be approximately \$1.3 million, which would be shared by the state, county and district as noted above.

Operations payroll is expected to generate \$99,450 in sales tax revenues annually with some returned to the County and communities in which purchases occurs. Equipment and materials purchased during operations would generate sales tax revenues, as some of the purchases would occur in the County and study area communities.

It was estimated by the applicant that this project would have an assessed value of \$265 million and at a recent average property tax rate of the applicant's other properties (1.132 percent) the annual property tax would be \$2.9 million. This estimate did not consider any potential property tax rebate offered under the Capital Investment Incentive Program (CIIP) since this is currently not available to geothermal electric generating facilities. Currently, the CIIP is available to manufactures identified within a range of standard industry codes that does not include geothermal electric generating facilities (CEOE 2002n).

SCHOOLS

The AFC (Section 5.9.6.5 School Districts) reports that Imperial County consists of 16 school districts, with a total of 31 elementary schools, 7 middle schools, 2 junior high schools, 9 high schools, and 7 continuation schools. The project site is in the Calipatria Union School District. Calipatria Union has one elementary school for kindergarten through 8th grade and another elementary school for kindergarten through 4th grade. There is one middle school for grades 5 through 8, one high school for grades 9 through 12, and one continuation high school for grades 9 through 12. School expansion information was available for the Calipatria Union School District, which forecasts an expansion to accommodate 100 additional students over the next two to three years from a current enrollment of 1,300 students. For the Calipatria Union School District currently:

- overall, is not at full (100 percent) capacity.
- where an individual school has grades at over full (100 percent) capacity (demand is greater than supply) , busing is used to alleviate the overcrowding problem.
- after the school expansion program is over, there will be no over full (100 percent) capacity (Raceles 2003).

School impact fees will only be paid to the Calipatria Unified School District serving the project area. Given that Calipatria Union School District assesses developer fees at the rate of \$0.34 per square foot of roofed area for commercial and industrial space times 8,804 square feet of development, the school impact fee amounts to \$2,993.36. This fee goes to the school district, and can be used for temporary or permanent construction.

Staff agrees with the applicant that most non-local construction workers (40 percent or 187 of the peak and 106 average workers) will probably not bring their families for the 26-month project slated to start construction in the 6th month. In addition, 90 percent of the 69 permanent operations staff are likely to reside in one of the several communities in Imperial County (seven employees may be non-local). Overall, staff expects no significant impact on study area schools.

Education Code section 17620 states that public agencies may not impose fees, charges or other financial requirements to offset the cost for “school facilities.” School facilities are defined as “any school-related consideration relating to a school district’s ability to accommodate enrollment.” Local and state agencies are precluded from imposing (additional) fees or other required payments on development projects for the purpose of mitigating possible enrollment impacts to schools.

POLICE PROTECTION

The AFC (Section 5.9.1.6.2 Law Enforcement) notes that the County Sheriff’s Department provides public protection services with 75 full time officers in unincorporated Imperial County which is where the SSU6 is located. Niland is about 7 miles away and is where the nearest sub-station is located, but it is not operational 24 hours a day. The El Centro station, which is 40 miles from the SSU6 project site is open 24 hours per day. Overall, average response time is 10 minutes to the project and there is no plan for additional police stations or officers as a result of the project.

The SSU6 project would not significantly increase the existing demand for police service or adversely affect police protection in and around the SSU6 project area. There would be a small increase in population during the 26 months of construction and during operation, but most of the workforce is local (CEOE 2002a).

MEDICAL SERVICES/UTILITIES

SSU6 will have its own emergency response plan. In an emergency the Calipatria Fire Department Emergency Medical Team, located 11 miles from the site, would be the first unit dispatched. Next would be Gold Cross Ambulance with 50 personnel, and a response time of 40 minutes from El Centro, and 20 minutes from Brawley. According to Gold Cross Ambulance, ambulances are more likely to be dispatched from Brawley located 20 minutes closer to the SSU6 project site. Furthermore, it would take approximately 20 minutes to send a person needing medical attention from the SSU6 project site to Pioneer Memorial Hospital in Brawley and 40 minutes to the El Centro Regional Center in El Centro (CEOE 2002a).

There are two hospitals in Imperial County. Pioneers Memorial Hospital is the closest and is about 22 miles from SSU6 with 105 doctors/physicians and 100 beds. El Centro Regional Medical Center is in El Centro about 30 miles away. El Centro Regional Medical Center has 107 beds and 137 doctors/physicians. The El Centro Regional Medical Center is currently undergoing expansion with a new building expected to be completed sometime in March 2003. The new building will be jointly used by the ICU (Intensive Care Unit), DOU (Definitive Observation Unit), and the Med-Surgery (Medical Surgery) unit (CEOE 2002a).

Increases in demand for emergency medical services and hospitals would be small due to the short-term nature of construction and the small-expected increase in population during operation and construction.

Increases in demand for utilities because of project construction or operation will not be great because project construction is short-term, 26 months, and not anticipated to increase demand for utilities. No natural gas will be used in this project. Imperial Irrigation District (IID) provides electric power to this area, which includes Imperial County and portions of Riverside and San Diego County.

Finally, the SSU6 project will not directly or indirectly induce substantial population growth. Hence, there are no significant socioeconomic impacts that might trigger adverse physical impacts in the provision of public services

CUMULATIVE IMPACTS

Cumulative impacts might occur when more than one project has an overlapping construction schedule that creates a demand for workers that can not be met by local labor, resulting in an influx of non-local workers and their dependents.

Construction of the SSU6 project is expected to occur between the last quarter of 2003 and the last quarter of 2005, with peak construction activity occurring in the first part of 2005. Three projects were identified in the area; however, only two projects had concurrent construction schedules with the SSU6 project. Since construction would

begin in 2004 and end in 2007, most construction of the State Route 78/111 Expressway (Brawley Bypass) would not coincide with construction of the SSU6 project. The project is also located 12 to 15 miles from the SSU6 Project. Due to the nature of the project, it is likely that both projects would require different types of skilled labor, and the concurrent construction schedules would not deplete certain types of trade labor and equipment even on a temporary basis. Cumulative impacts would not be considered significant.

Construction activities associated with the Imperial Irrigation District Water Conservation and Transfer Project/Habitat Conservation Plan are anticipated to begin by the end of 2003 and be on going. Although the SSU6 Project would be constructed concurrent with some of these construction activities, cumulative impacts would not be considered significant because these projects will require skilled workers from different crafts. There are no concurrent power/generating construction projects planned in the project vicinity (CEOE 2002e).

Because the SSU6 would not result in any significant adverse socioeconomic impacts to population, housing, or public services, it is unlikely that it would contribute significantly to cumulative socioeconomic impacts. Staff concludes that there are no significant adverse cumulative socioeconomic impacts.

MINORITY AND LOW-INCOME POPULATIONS (ENVIRONMENTAL JUSTICE SCREENING ANALYSIS)

The purpose of the environmental justice (EJ) screening analysis is to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis", Guidance Document, (EPA 1998). Minority populations, as defined by this Guidance Document, are identified where either:

- the minority population of the affected area is greater than fifty percent of the affected area's general population; or
- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

In 1997, the President's Council on Environmental Quality issued Environmental Justice Guidance that defines minority as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census's Current Population Reports, Series P-60 on Income and Poverty (OMB 1978).

Staff has reviewed Census 2000 information for the project area by census block that shows the minority population is 65.77 percent. This percentage is greater than staff's threshold of fifty percent within a six-mile radius of the proposed SSU6 power plant (See **Socioeconomics Figure 1**). Additionally, Census 2000 by Census Block Group data for the area shows that the low-income population is 18.55 percent within the same

radius. Poverty status excludes institutional people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

Based on this socioeconomic analysis, staff has not identified significant direct or cumulative, adverse socioeconomic impacts resulting from the construction or operation of the project. The SSU6 will be built in a rural area, will not physically alter the community, and will largely utilize a local labor force that would not create any new significant demands on community infrastructure and services. Therefore, there are no socioeconomic EJ issues related to this project.

For a listing of other technical sections that include an EJ analysis, please refer to the **Introduction** section of this **Preliminary Staff Assessment**. For a summary of Environmental Justice impacts regarding these other sections, please see the **Executive Summary**.

FACILITY CLOSURE

PLANNED CLOSURE

The SSU6 AFC did not provide for the inclusion of socioeconomic LORS that will be incorporated into the facility closure plan when it becomes necessary at the end of the project's economic life. The socioeconomic impacts of facility closure will be evaluated at that time. The planned lifetime of the proposed power plant is 30 years.

UNEXPECTED TEMPORARY CLOSURE

Any unexpected, temporary closure would not likely cause any significant environmental impacts on the affected area, because the likely result of a temporary closure would be reactivation of the power plant by the same or a new owner within a relative short period of time. Personnel changes may occur if there is an ownership change, but socioeconomic impacts would not change significantly because the number of operating personnel would remain relatively the same.

UNEXPECTED PERMANENT CLOSURE

Any unexpected, permanent closure of the SSU6 would not likely cause any significant adverse socioeconomic impacts on the affected area, because facility closure impacts (i.e., dismantling) would be similar to construction impacts, and staff has found no significant adverse socioeconomic impacts due to the construction of the project.

MITIGATION

Since staff has not identified any significant adverse socioeconomic impacts, no mitigation measures are proposed.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

There are estimated gross benefits from the SSU6, which include increases in sales taxes, employment, and income for Imperial County (secondary impacts could spill over outside Imperial County). For example, during construction, there are estimated to be 265 direct project-related construction jobs for 26 months of construction, resulting in 834 total jobs (265 average construction jobs x 3.1 based on IMPLAN SAM variety construction employment multiplier) that will be created, of which 570 are secondary (indirect and induced) jobs. Secondary construction income impacts are estimated at \$16.9 million. For operations, 69 direct jobs will be created with 110 secondary (indirect and induced) jobs for a total of 179 jobs. Secondary operation income impacts are estimated at \$3.6 million. The sales tax on materials (purchase of equipment) is estimated to be \$7.7 million, some of which would be returned to Imperial County and the study area communities. Property taxes would be \$2.9 million annually over a planned plant life of 30 years.

Staff finds that the SSU6 will not cause a significant adverse socioeconomic impact on the affected area's (i.e., the labor supply area) housing, schools, police, emergency services, hospitals, and utilities. Based on staff's demographic screening analysis, the minority population within six miles of the proposed power plant site met the threshold of greater than 50 percent, though this was not true for low-income people. There were no significant adverse socioeconomic impacts since most of the construction and operation workforce is within the regional or local labor market area and construction activities are short-term. Staff has determined that there would be no significant adverse direct or cumulative socioeconomic impacts and therefore, there are no socioeconomic environmental justice issues.

The SSU6 project, as proposed, is consistent with all applicable socioeconomic LORS.

RECOMMENDATIONS

Staff recommends approval of the SSU6 project with one proposed condition of certification.

PROPOSED CONDITION OF CERTIFICATION

SOCIO-1 The project owner shall pay the one-time statutory school facility development fee as required at the time of filing for the in-lieu building permit with the Imperial County Building Department.

Verification: The project owner shall provide proof of payment of the statutory development fee in the next Monthly Compliance Report following the payment.

(Rev. 2/7/02)

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Socioeconomics Figure 1

SOIL AND WATER RESOURCES

Mike Krolak

INTRODUCTION

This analysis examines the soil and water resource aspects of the Salton Sea Unit 6 Project (SSU6 Project) proposed by CE Obsidian Energy, LLC, specifically focusing on the following:

- Whether the project's demand for fresh inland surface water affects long-term reliability of water supply;
- Whether the project's wastewater management practices would lead to degradation of surface or ground water quality;
- Whether the project construction or operation would lead to degradation of existing surface drainage or surface water quality; and,
- Whether the project would comply with all applicable laws, ordinances, regulations and standards.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States.

The Clean Water Act requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. These discharges are regulated by the National Pollutant Discharge Elimination System (NPDES). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards (RWQCBs). The Colorado River Basin Regional Water Quality Control Board (CRBRQWCB) regulates NPDES permits for cooling water, construction and operational stormwater discharges, and other wastewater discharges for this project.

Section 401 of the Act requires that the RWQCB must certify any activity that may result in a discharge into a waterbody. This certification ensures that the proposed activity will not violate state and federal water quality standards.

Section 404 of the act regulates the discharge of dredged or fill material into waters of the United States, including rivers, streams, and wetlands. Site-specific or general (Nationwide) permits for such discharges are issued by the Army Corp of Engineers (ACOE) and are certified by the RWQCB under Section 401.

Resource Conservation and Recovery Act

40 CFR part 261 identifies those solid wastes which are subject to regulation as hazardous wastes which are subject to the notification requirements of section 3010 of RCRA. These definitions exempt geothermal fluids from hazardous waste classification.

STATE

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1967, Water Code section 13000 et seq., requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. These criteria include the identification of beneficial uses, narrative and numerical water quality standards and implementation procedures. The criteria for the project are contained in the Water Quality Control Plan (Basin Plan), Colorado River Basin Region. This plan sets numerical and/or narrative water quality standards controlling the discharge of wastes to the state's waters. These standards would be applied to the proposed project through the Waste Discharge Requirements (WDRs), during construction and/or operation of the project.

The Safe Drinking Water And Toxic Enforcement Act of 1986 (Proposition 65)

The Safe Drinking Water and Toxic Enforcement Act of 1986, Health and Safety Code section 25249.5 et seq., prohibits the discharge or release of chemicals known to cause cancer or reproductive toxicity into drinking water sources.

Public Resources Code, Division 3, Chapter 4, Sections 3700-3776

These sections of the California Public Resources Code require that wells for the discovery and production of geothermal resources be drilled, operated, maintained, and abandoned in such manner as to encourage the greatest ultimate economic recovery of geothermal resources, to prevent damage to life, health, property, and natural resources, and to prevent damage to, and waste from, the underground and surface waters suitable for irrigation or domestic purposes by reason of the drilling, operation, maintenance, and abandonment of geothermal resource wells. The California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) regulates these wells.

The California Code of Regulations, Title 14, Division 2, Chapter 4, Subchapter 4 contains the articles that regulate the CDOGGR review and approval process for these facilities. The substantive articles address the following: drilling, blowout prevention, completion and production, injection, subsidence, and plugging and abandonment.

California Constitution, Article X, Section 2

This section requires that the water resources of the State be put to beneficial use to the fullest extent possible. The waste, unreasonable use or unreasonable method of use of water is prohibited. The conservation of such waters is to be exercised with a view to the reasonable and beneficial use in the interest of the people and for the public

welfare. The right to water or to the use or flow of water in or from any natural stream or water course in the State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use, or unreasonable method of use, or unreasonable method of diversion of water. This section is self-executing, and the Legislature may also enact laws in the furtherance of the policy contained in this section.

STATE POLICIES

State Water Resources Control Board Policy 75-58

The SWRCB has also adopted a number of policies that provide guidelines for water quality protection. The principle policy of the SWRCB which addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for powerplant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. This SWRCB policy requires that power plant cooling water should come from, in order of priority:

- wastewater being discharged to the ocean
- ocean water
- brackish water from natural sources or irrigation return flow
- inland waste waters of low total dissolved solids
- other inland waters

This policy also addresses cooling water discharge prohibitions.

LOCAL

Imperial County Land Use Code

Division 16, Chapter 3

This chapter establishes that this ordinance applies to all areas of special flood hazards, including land around the Salton Sea and lying at or below the -220 foot elevation contour.

Division 16, Chapter 4

This chapter identifies development permit requirements for special flood hazard areas. These requirements include, but are not limited to, plans in duplicate drawn to scale showing the nature, location, dimensions and elevations of the area in question; existing or proposed structures, fill, storage or materials, drainage facilities; and the project location.

Division 17, Chapter 1

This chapter establishes regulations to facilitate the beneficial use of the geothermal resource, to prevent wasteful or detrimental uses, and to protect people, property, and the environment from adverse impacts of improper use of the resource.

Section 91701.01, Item J requires an Emergency Response Plan be prepared in consultation with appropriate agencies to address emergencies including but not limited to blowouts and major fluid spills.

Section 91701.01, Item O requires that facilities be designed to protect surface and ground water quality.

Section 91702.00, Specific Standards, C requires that the site be designed to retain the maximum amount of usable agricultural land and that the site not interfere with irrigation or drainage patterns, and shall comply with the requirements and regulations of the Imperial Irrigation District.

Section 91702.00, Specific Standards, H requires that permanent sumps, brine ponds, waste holding ponds, and any other pond be designed and constructed to meet sound engineering standards and the regulations and requirements of the Regional Water Quality Control Board.

SETTING

VICINITY AND SITE DESCRIPTION

The proposed project would be located in a region known as the Salton Basin. The proposed facility site would occupy approximately 80 acres. The eight production and injection well pads would occupy approximately 5 acres each; linear facilities, including brine pipelines, transmission towers, and the Bannister Road switchyard would bring the total land occupied by the project to approximately 197 acres. Of this 197 acres, 173 acres are currently used for farmland production. The power plant site would be graded to a final elevation of -228 feet.

The climate of the Salton Basin region is influenced heavily by the mountains in the area. Cool, moist westerly winds blow inland from the Pacific Ocean, losing their moisture as they rise up over the San Bernardino and San Jacinto Mountains. These winds, now dry, heat up as they flow down into the Salton Basin, producing the arid environment that dominates the Basin.

Temperatures in the Basin vary over a great range. July temperatures range from average lows of 75°F to average highs of 107°F, while January temperatures range from average lows of 38°F to average highs of 70°F.

Recent annual rainfall averages have been as low as 0.3 inches during the winter of 1995-96, and have been as high as 7.7 inches during the winter of 1992-93. **SOIL & WATER Table 1** depicts the average monthly rainfall for the basin.

SOIL & WATER Table 1
Average Monthly Precipitation for the Salton Basin (inches)

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|------|------|------|-----|-----|-----|-----|-----|-----|
| 0.6 | 0.4 | 0.2 | 0.08 | 0.03 | 0.01 | 0.1 | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 |

Source: Redlands 2002.

While rainfall events generally occur in the winter months, during summer months, warm, moist tropical air moves from the Gulf of California and Mexico into the Colorado Desert, occasionally bringing thunderstorms to the Basin. In addition, the hot desert sun warms the water in the Gulf, which rises and picks up vast amounts of water vapor, sometimes forming thunderheads and occasionally a tropical cyclone. These storms, which occur infrequently (once every five to ten years) bring near hurricane-strength winds which pick up sand and debris, and bring nearly three or four years worth of average precipitation in just a few years (Redlands 2002).

Surface Hydrology

The Salton Sea and its two primary tributaries, the Alamo River and the New River, are the most prominent surface water bodies in the project vicinity. The project is located in a 7,851 square mile watershed known as the Salton Basin. The Salton Basin is a closed basin, which means that it has no outlet; in this case, no rivers or streams flow out from the Salton Sea.

An outlet can stabilize water quality by consistently flushing the system, however, water leaves the Basin only through evaporation. Absent current inflows, the Salton Sea would dry up in about ten years. However, approximately one-sixth of the Sea is replaced each year, equal to the amount lost through evaporation (Redlands, 2002). The Alamo and the New Rivers account for approximately 77% of the inflow to the Salton Sea each year (Redlands 2002).

Approximately 1.36 million acre-feet per year (AFY) of water evaporates from the Sea's 381-square mile surface (Redlands 2002). This evaporation concentrates all the chemical substances that make their way to the Sea. The most abundant of these substances are salts, entering the sea at a rate of approximately 4,000,000 tons of dissolved salt per year. Scientists estimate that there are approximately 500 million tons of salt in the Salton Sea, creating a concentration of approximately 44 parts per thousand (ppt). For comparison, the Pacific Ocean salt content is approximately 35 ppt, or about 25% less saline than the Salton Sea (SSA 2000).

The Alamo and New Rivers are both perennial waters originating in Mexico. Alamo River inflows come primarily from agricultural runoff, and as a result the stream is listed as impaired under the Clean Water Act 303(d) lists for pesticides, silt, and selenium. The New River is fed by agricultural runoff as well, but also receives untreated wastewater flows from Mexico. The New River is listed as impaired for pesticides, silt, nutrients, bacteria, and volatile organic compounds (VOCs).

The SSU6 site occupies land designated by the Federal Emergency Management Agency (FEMA) as Zone A (within the 100-year floodplain) and Zone D (possible but undetermined flood hazard). The site is currently in use for agricultural purposes, and is artificially graded and conditioned, so natural swales and drainage features do not

currently exist on-site. The site is currently surrounded by a series of eight-foot-tall levees that also act as access roads for the area. The levees and berms in the project vicinity control run-off and direct stormwater to canals that terminate in the Salton Sea.

Man-made canals comprise a large number of smaller surface water conveyances in the area. Canals operated by the Imperial Irrigation District criss-cross the vicinity of the project, generally paralleling roads and other permanent features. The canals are used to distribute irrigation water to agricultural lands and other projects, and some canals are dedicated to conveying agricultural tailwaters to the Salton Sea.

Ground Water

Ground water at the site is categorized under the Imperial Valley Planning Area according to the Region 7 Basin Plan (CRBRWQCB, 2002). Ground water in the site vicinity generally flows toward the axis of the Imperial Valley and then northward to the Salton Sea (CEOE 2002a Page 5.4-4). This ground water recharge accounts for approximately four percent of the Sea's annual inflow (Redlands 2002), and also provides recharge for the Alamo and New Rivers.

The geotechnical investigation performed at the site and included in Appendix J of the AFC found that the depth to groundwater is shallow at the project site, ranging from approximately three to six feet. During periods of heavy irrigation, the water table can rise to 18 inches below ground surface (CEOE 2002a Page 5.3-2). The shallow ground water aquifers in the central Imperial Valley are fed primarily by seepage from agricultural canals and drains throughout the region. Leaching of salts from irrigated lands contributes high salinity to ground waters in the central Imperial Valley, as total dissolved solids concentrations vary between 1,000 and 3,000 mg/L (ICPBD 1993).

The upper 500 feet of soil in the central part of the valley range has transmissivities from 150 to 1,500 feet squared per day, which is very low compared to soils in the eastern and western Imperial Valley (approximately 20,000 to 30,000 feet squared per day) (USGS 1995). These low permeabilities minimize mixing of waters between shallow and deep aquifers in the region. Tile-drain systems are required to dewater the sediments to a depth below the root zone of most crops (ICPBD 1993).

Few wells have been drilled in these lake sediments because of the poor yield and saline quality. In addition, studies performed by the Regional Board and U.S. Geological Survey indicated that drainage water in the Imperial Valley contains pesticides in quantities which often exceed the Environmental Protection Agency's criteria for protection of fish and wildlife, as well as high levels of sediments and nutrients (ICPBD 1993).

The deep aquifer has been estimated to contain anywhere from 1.1 billion to 3 billion acre-feet of water, with the recoverable amount around 20% (220 million to 600 million acre-feet). Annual recharge is about 400,000 acre feet from various sources (ICPBD 1993). Referred to as the Salton Sea Known Geothermal Resource Area (KGRA), this aquifer includes brines from which geothermal steam is extracted for powering the turbine. Detail regarding the geothermal resources specific to SSU6 are further described in CEC 2002e, CEOE 2002i, CEOE 2002j, and DOGGR 2002. For more

information on the sufficiency of the fuel supply, please refer to the finding of sufficient geothermal resource for the project (CEC 2003b).

Soils

Soils underlying proposed project facilities consist of 15 different soil types. However, more than 95% of the project would disturb only two soil types.

Approximately two-thirds of the disturbance would impact soils of the Imperial-Glenbar Series, Silty Clay Loams, Wet, with slopes from zero to two-percent. This poorly drained soil is level and very deep. Permeability is slow to rapid, with shrink-to-swell potential ranging from moderate to high. This soil is highly susceptible to water erosion, and moderately susceptible to wind erosion.

The other approximate third would disturb Holtville Silty Clay, Wet. This poorly drained soil is nearly level and very deep. Permeability is slow to rapid, with shrink-swell potential ranging up to high. Much like the Imperial-Glenbar Series soils on the project site, this soil is highly susceptible to water erosion, and moderately susceptible to wind erosion.

Fifteen of the twenty soil-mapping units in the SSU6 vicinity, when irrigated, meet the criteria for either Prime Farmland or Farmland of Statewide Importance as designated by the United States Department of Agriculture's Natural Resources Conservation Service. For more information regarding farmland impacts, please refer to the **LAND USE** section of this document.

PROJECT DESCRIPTION

The proposed SSU6 Project would produce a nominal 185 MW, and consist of a geothermal Resource Production Facility (RPF), a geothermal-powered Power Generation Facility (PGF), and associated linear and on-site facilities. The RPF would include extraction wells, brine and steam handling facilities, solids handling facilities, two brine ponds, injection wells, and steam polishing equipment. The PGF would include a condensing turbine/generator set, gas removal and abatement systems, and a heat rejection system. The project would require approximately 293 AFY of fresh water during an average year, but could require up to 987 AFY if the brine were to reach a salinity of 25.0% (for a full discussion see the **Fresh Water Supply** discussion below).

Ten production wells would produce the geothermal brine, from which steam is extracted and utilized as fuel in the PGF process. These production wells are generally located to the northwest of the plant facility. Once solids are removed to appropriate levels, a portion of the treated brine would be used as makeup water in the cooling towers for heat rejection by evaporation.

Process wastewater would be reinjected back into the geothermal aquifer to the southeast of the plant facility to facilitate the renewable quality of the resource. When necessary, the brine would be pumped to one of two lined brine ponds for storage prior to reinjection or disposal.

Stormwater would be routed to an evaporation/percolation pond located in the northwest corner of the project site. The pond is designed to hold runoff from a 10-year, 24-hour storm event. In the event of a 100-year, 24-hour storm event, the system is designed to direct excess runoff to the service water pond if necessary to prevent stormwater discharge off-site. Stormwater routed to the service water pond may then be used to process heat-depleted brine.

The project would also consist of various linear facilities to serve the project. A total of approximately two miles of cement-lined carbon-steel pipelines would bring the geothermal brine from the production wells to the facility, and a total of approximately three miles of cement-lined carbon steel pipelines would direct the spent brine to the injection wellheads. Five hundred feet of buried pipeline would carry fresh water to the project's service water pond from the Imperial Irrigation District (IID) delivery system.

The project would also require a 16-mile transmission line that would connect the project to an existing IID L-Line Interconnection, and a 15-mile transmission line to tie-in to the existing IID Midway substation.

Please refer to the **Project Description** section of this document for more information on SSU6 Project facilities.

Water Supply

The primary water demand for the SSU6 Project is for cooling tower makeup. This water demand would be satisfied by condensate from the geothermal brine. This brine comprises the fuel as well as the cooling water for the project. During average conditions, the production wells would bring 25,536 gallons per minute (gpm) of geothermal brine with wellhead temperatures approaching 500°F to the Brine/Steam Handling facility.

Steam is flashed off in three stages: high pressure, standard pressure, and low pressure. All of the steam (approximately 5639 gpm) is sent to the PGF, where it is forced through the turbine/generator, producing 185 MW of net power. After powering the turbine steam is sent to the condenser, this condensate is routed to the cooling tower, where 4,289 gpm (6.2 million gallons per day) is evaporated in the cooling process.

The SSU6 project would also require fresh water to dilute and cool the brine prior to reinjection. A water balance diagram submitted as part of Data Response 76 (CEOE 2002I, Figure 3.3-9b) that depicts the extreme hour case shows 1,625 gpm of fresh water to be consumed in the cooling towers for evaporative cooling, and Data Response 75 (CEOE 2002I) states that fresh water augmentation for cooling purposes may be required under certain operating circumstances. This demand would be met by the delivery of 293 acre-feet per year (AFY) to the project by IID. The Applicant has contracted a supply of up to 1000 AFY with IID to meet fresh water demands under varying conditions.

IID would supply this water from their annual entitlement of 2.6 million acre-feet (MAF). This water right was defined in 1964 as a result of the United States Supreme Court Case of *Arizona v. California* (373 U.S. at 546), and this case also defined those rights as “present perfected” rights, which are rights that must be satisfied first during times of shortage (IID 2002b). The rights acknowledged in this case also preempt the 1902 Reclamation Law.

The project includes construction of a buried 500-foot pipeline that would tie into the existing IID delivery system to facilitate the transfer of water to the site.

California Water Rights and the Colorado River

In accordance with the Colorado River Compact of 1922, the Upper and Lower Basin States are each entitled to the exclusive beneficial consumptive use of 7.5 million acre-feet (MAF) of Colorado River water each year, in perpetuity. In addition, an option is granted to the Lower Basin States for the use of an additional 1.0 MAF for beneficial consumptive use. The 1929 California Limitation Act limits California's annual consumptive usage to 4.4 MAF, plus not more than one-half of any excess or surplus water unapportioned by the Compact.

While California has been apportioned this 4.4 MAF (plus excess), it has been using approximately 0.8 MAF more than the amount determined by legislation and reaffirmed in a supplemental decree issued for the case of *Arizona v. California* in 1979 by the U.S. Supreme Court. IID has delivered an average of 2.84 MAF from 1996 to 2001, with approximately 97% of that water being delivered for agricultural uses (IID 2002a).

Recently, the U.S. Department of the Interior ruled that California must reduce its usage to the approved 4.4 MAF allotment because a plan to reduce Colorado River water use to that level over a set period of time was not agreed upon by the water purveyors concerned with this issue in California. While hope for a satisfactory plan still remains, two State Senators have announced their intention to introduce legislation that would prohibit IID from delivering more than their historic 2.6 MAF baseline water right. Discussion and negotiations at various levels concerning this case will likely continue into the future.

Wastewater

The SSU6 Project would dispose of most waste streams through the use of injection wells. Seven injection wells would reinject spent brine, drilled to depths between 8,500 and 8,800 feet. These wells would be cased to depths between 3,650 and 5,250 feet.

One dedicated injection well would inject cooling tower blowdown, and another would inject liquids from the brine ponds. These wells would be designed to discharge those waste streams at depths between 1,200 and 2,250 feet.

After steam has been flashed off of the geothermal brine and solids are handled, it would pass through the clarifiers and would be reinjected at an annual average rate of 19,201 gpm. Approximately 433 gpm of liquid waste from the thickener, which includes filter press filtrate, and liquid from bermed areas around plant equipment would be injected with the spent brine.

When necessary during non-standard conditions such as maintenance or injection shut down, the brine would be directed to the two brine ponds and would eventually be reinjected through the dedicated brine pond well. The ponds are sized to hold 548,000 cubic feet of brine, allowing for two feet of freeboard.

Approximately 983 gpm of cooling tower blowdown would be injected through the dedicated cooling tower blowdown well.

Domestic waste would be directed to a septic tank, which would be pumped out as necessary.

ENVIRONMENTAL IMPACTS

DIRECT AND INDIRECT IMPACTS

Surface Hydrology

Development of roads, buildings, and other paved or impermeable surfaces constructed as part of the project would increase the amount of runoff at the site. This may increase stormwater flows and may increase the chances for contaminants to enter stormwater flows and be carried off-site.

The SSU6 Project would be required to comply with the general NPDES requirements that regulate storm water effluent limitations and monitoring and reporting requirements for construction activities stormwater and the industrial activities (operational) stormwater general permits. The applicant would supply all information required by the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) to determine compliance with the NPDES requirements for storm water discharge. When the information provided is satisfactory to the CRBRWQCB, the project owner would receive both an NPDES General Permit for Stormwater Discharges Associated with Construction and an NPDES General Permit to Discharge Stormwater Associated with Industrial Activity.

The project would also be required to incorporate a Stormwater Pollution Prevention Plan (SWPPP) into its design to ensure that stormwater discharges from the project are handled properly with respect to both volume and water quality.

The project would construct a 4.4 acre-foot capacity detention basin to prevent stormwater runoff from leaving the site. The detention basin is designed to handle the runoff from a 10-year, 24-hour rainfall, and would function primarily as an evaporation/percolation basin. Stormwater runoff with the potential for oil contamination would be routed to an oil/water separator before being discharged to the detention basin. In the event of a 100-year, 24-hour storm event, the system is designed to direct excess runoff to the service water pond if necessary to prevent stormwater discharge off-site. The 100-year, 24-hour storm event water volume would still allow for 0.82 feet of freeboard in the service water pond (CEOE 2002e, page WATER-19). Stormwater routed to the service water pond may then be used to process heat-depleted brine.

During construction, stormwater would be directed to either the detention basin or the brine ponds, both of which would be constructed during the early stages of grading.

This design and mitigation should result in no significant impacts on stormwater volumes or water quality. If the proposed mitigation measures and conditions of certification are implemented, no significant stormwater runoff impacts are expected. Please refer to the **Mitigation** discussion for further information on stormwater runoff-related issues and requirements.

Flooding

The site would be graded to final elevation –228 feet. Imperial County land use ordinances state that developments below elevation –220 feet are required to apply for a Development Permit. The County retains permitting authority for project well pads and pipelines. The CEC retains permitting authority for the project site.

The SSU6 site occupies land designated by the Federal Emergency Management Agency (FEMA) as Zone A (within the 100-year floodplain) and Zone D (possible but undetermined flood hazard). However, the agricultural fields at the site are currently surrounded by an eight-foot berm. This berm would require improvements to satisfy flood protection ordinances for industrial development, and would hence be improved to withstand hydrostatic pressure up to the height of the berm. However, because the berm currently surrounds the parcel (CEOE 2002e, Page WATER-21), the parcel has already been removed from the floodplain, and would create no further diversions or impede flood flows in a more significant manner than the existing conditions at the site. Therefore, staff anticipates no new impacts to the 100-year floodplain and no significant flood protection impacts to the site resulting from the proposed project.

Ground Water

Some excavations would require dewatering due to a shallow water table. This water would be used during construction for dust suppression. Staff finds this to be a beneficial use of such water.

For a discussion of potential impacts to ground water quality, please refer to the **Water Quality** discussion.

Soil Erosion and Sedimentation

Accelerated wind and water-induced erosion may result from earthmoving activities associated with construction of the proposed project. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities, can result in on-site erosion eventually increasing the sediment load within nearby receiving waters.

Land disturbance figures for the project can be found below in **Soil & Water Resources Table 1**.

Soil & Water Resources Table 1
Land disturbance for SSU6 (in acres)

| Project Element | Temporary Disturbance | Permanent Disturbance |
|-------------------------------------|------------------------------|------------------------------|
| Plant Facility | 80.0 | 80.0 |
| Substation | 11.0 | 11.0 |
| Construction Laydown for Plant Site | 20.0 | 0.0 |
| Production Wells | 26.2 | 26.2 |
| Injection Wells | 15.4 | 15.4 |
| Production Pipelines | 13.3 | 13.3 |
| Injection Pipelines | 40.0 | 40.0 |
| L-Line Interconnection Poles | 89.0 | 2.7 |
| L-Line Access Roads | 35.2 | 6.6 |
| IID Midway Interconnection Poles | 88.0 | 2.6 |
| Laydown Along Transmission Routes | 48.0 | 0.0 |
| Construction Parking | 4.4 | 0.0 |
| Pull Sites | 39.0 | 0.0 |
| Total | 479.5 | 197.8 |

Source: CEOE 2002a, Table 3.2-2

Where soils would be disturbed during construction, the surface would be void of vegetation and would have the highest potential for erosion.

In Data Response 71 (CEOE 2002I), the applicant provided preliminary Storm Water Pollution Prevention Plans (SWPPP) for the construction and operation phases of the SSU6 Project. Plans approved by the CEC Compliance Project Manager (CPM) would be required prior to any earthmoving activities and power plant operation, respectively. These plans would require the implementation of Best Management Practices (BMPs) to reduce potential erosion and sedimentation impacts. Approval and implementation of appropriate plans prior to any earthmoving activities would mitigate erosion and sedimentation impacts to less than significant levels. Please refer to **Conditions of Certification SOIL & WATER-1, 2, and 3** for more information.

The proposed SSU6 Project would convert approximately 173 acres from agricultural use to industrial use. IID's water service area covers approximately 484,000 acres of agricultural land, meaning that the project would take approximately 0.0004 percent of the agricultural land in this area out of production. For a discussion of farmland impacts, please refer to the **LAND USE** section of this document.

The project would also entail the discharge of fill to an inundated area adjacent to the Salton Sea and associated jurisdictional waters to widen an existing road and install a pipeline crossing. The applicant has applied for a Clean Water Act Section 401 Permit with the CRBRWQCB and a Clean Water Act Section 404 Permit with the U.S. Army Corps of Engineers.

These permits would require the applicant to implement BMPs to minimize and/or mitigate impacts to jurisdictional waters and associated biota. These BMPs would be included in the Erosion and Sedimentation Control Plans that would be required as part of certification. Please refer to **Condition of Certification SOIL & WATER-3** for more information.

For further discussion of mitigation required to offset loss of wetlands and associated biota, please refer to the **BIOLOGICAL RESOURCES** section of this document.

Water Supply

Fresh Water Supply

As proposed, the SSU6 project would use an annual average of 293 AFY of fresh water delivered from IID's canal system.

This water demand is based on the design salinity of 23.5% for the geothermal brine, derived from analysis of TDS trends of current production wells tapping the geothermal aquifer. The fresh water would be used to cool and dilute the brine to make it suitable for reinjection to the geothermal aquifer. The applicant has noted in the AFC (CEOE 2002a Vol. I, page 5.4-8 that if the brine were to reach a salinity of 25.0%, the project would require water at a rate of 987 AFY.

In Data Response 78 to CURE's Data Requests (CEOE, 2003a), the applicant provided a summary of historical data regarding the TDS concentrations of the brine from the Salton Sea KGRA. The summary stated that the TDS of the brine in the Region 1, Region 2 and Elmore areas remains virtually constant according to the 14-year historical data. The applicant states that some production wells in the area even trend downward. Only one production well near the Leathers plant revealed an increase in TDS levels. At the Leathers plant, where dilution water is required, water demand has remained essentially steady over the past three years.

Above a salinity of 23.3%, "the required dilution water is provided by plant condensate and augmented by fresh water as needed." (CEOE 2003f) The applicant has noted that fresh water demand does not fluctuate according to ambient thermal conditions at salinities below 23.8% (Data Response 144, CEOE 2003f). Because the expected salinity is 23.5%, the fresh water demand of the project is expected to be relatively constant at 293 AFY. However, when ambient temperatures exceed 113°F and salinity exceeds 23.8%, fresh water may be required to augment cooling at the facility. In Data Response 146, the applicant estimates an average of 2.9 AFY of fresh water would be used to augment cooling. Because of the minimal fresh water use for cooling, staff does not believe that this is an unreasonable use of fresh water.

The project would also be taking 173 acres of farmland out of production as a result of development associated with the RPF, PGF, and associated facilities.

In Data Response 84 to CURE's Data Requests (CEOE 2003a) the applicant provided an attachment (CDR-84) from IID that estimated water use at the site to be approximately five AFY per acre of irrigated land. This factor multiplied by 173 acres indicates a total of 865 AFY of water use would be offset by converting that land to

industrial use. Subtracting the project's average annual water use (293 AFY) from that figure, the applicant estimates that the project would result in a net savings of 572 AFY of fresh water for IID. If the plant operated with a geothermal brine salinity of 25.0% for an entire year (requiring 987 AFY), which is considered unlikely, the project would increase IID's current fresh water deliveries by 122 AFY.

The baseline water use of five AFY/acre included in CDR-84 was derived from IID water delivery data from 1887-1995. To establish an appropriate CEQA baseline, staff is coordinating with IID to obtain more recent water delivery data. This data will be used to establish a more applicable baseline against which the proposed fresh water usage will be compared. Staff is also coordinating with IID to determine what, if any, impacts would result from the applicant exceeding historical use at the site, forcing payment for Conservation Plan activities as specified by the applicant's contract with IID. This information will be analyzed for the Final Staff Assessment.

The applicant has proposed to store the project's fresh water supply in a lined earthen surface pond. In Data Response 114 to CURE's Data Requests (CEOE 2003a), the applicant estimated an average loss of approximately 20 AFY and a maximum loss of approximately 30 AFY to evaporation due to high temperatures in the region. Staff believes that such loss would be unnecessary and is avoidable, and recommends that the project be required to store its fresh water supply in an enclosed storage tank to minimize the unnecessary waste of water to the atmosphere. This storage tank should be designed to store a minimum of a 6-day water supply buffer as required by IID Rules and Regulations Regarding the Use and Distribution of Water No. 13. Please refer to **Condition of Certification SOIL & WATER-6** for more information.

Alternative Water Sources

The SSU6 Project will not use a significant amount of fresh water for cooling under average conditions. The fresh water use of the project will consist mainly of fresh water to handle and condition the brine for reinjection. The brine distillate will be used for cooling which is non-potable water, and is excluded as a drinking water source by the CRBRWQCB. However, Article X of the California Constitution states that the use of high quality fresh inland water for cooling, process water and other non-potable uses when recycled water is available is a waste or unreasonable use of fresh water. Therefore, due to the average use of 293 AFY of fresh water for non-potable use, staff will provide an analysis of alternative water sources.

The use of recycled water in lieu of IID fresh water would free up fresh water resources for use in other applications. The most likely source for recycled supply would be the City of Westmorland. The City's newly upgraded wastewater treatment plant produces approximately 0.5 million gallons per day (560 AFY) of treated recycled water. 560 AFY would be adequate for non-cooling process water under average conditions for an entire year, however, this would not be adequate under high-demand periods for the project.

Use of this supply would require the construction of an approximately 8.5-mile pipeline as well as additional treatment facilities to bring the water to a level of purity appropriate for use in the SSU6 facility. The applicant has already voiced concerns with the use of

recycled water in the facility as disinfectants that may be used in the treatment process may pose a risk to some equipment used at the plant.

Staff will provide further alternative water source analyses in the FSA.

Cooling Water Supply

As described above in the **Project Description** discussion, the project would use approximately 4,289 gpm of steam condensate for evaporative cooling. This water originates in the geothermal aquifer, with total dissolved solids (TDS) concentrations of approximately 235,000 milligrams per liter (mg/L).

The Safe Drinking Water Act defines Underground Sources of Drinking Water as aquifers with water having TDS concentrations of less than 10,000 mg/L. Aquifers containing ground waters known to be a source of geothermal energy are also exempted from consideration as a potential drinking water supply by the CRBRWQCB. Due to the high TDS values of the brine, it is generally unfit for most uses outside of geothermal applications.

This water would best be categorized as “brackish water from natural sources” as it relates to State Water Resources Control Board Policy 75-58, which is the primary guidance for assigning priority of water use for power plant cooling in the state. Staff believes that this water is suitable for cooling purposes and is available in sufficient quantity to cool the plant. In addition, the applicant has proposed using this water at a minimum of 20 cycles of concentration in the cooling towers to ensure optimum use of condensate make-up water supplies (CEOE 2002I, Data Response 79). On January 21, 2003 the Committee assigned to the SSU6 AFC made a finding of sufficient geothermal resource for the project (CEC 2003b).

Water Quality

Improper wastewater disposal can lead to soil, surface and ground water degradation, and impairment of beneficial uses.

Injection/Production Wells and Brine Handling

While not a wastewater stream, the produced brine is saturated with very high levels of chemicals and could adversely impact local water quality if improperly handled. The high salinities of the brine are far above naturally occurring salinities of ground water in the vicinity, and therefore could significantly alter the chemistry of local groundwater if brine were to reach those aquifers.

The shallow ground water in the project vicinity is not used for municipal or industrial purposes, and is not deemed suitable for agriculture by the CRBRWQCB in their Basin Plan for Region 7 (CRBRWQCB 2002, p. 2-18). In addition, the low transmissivities of the soil would aid in inhibiting the flow of surface spills toward ground water aquifers if spills were handled properly and in a timely manner. Staff is proposing mitigation to ensure that proper spill contingencies are addressed. Please refer to the **Mitigation** discussion for more information.

Percolation tests performed in conjunction with the Geotechnical Investigation included in the AFC (CEOE 2002a, Appendix J) cited percolation rates between 1.3 and 2.6 gallons per day at the site. These tests were performed on the Holtville silty clay, wet soil type, which is the same soil type underlying all but about 600 meters of injection pipelines and all but about 900 meters of production pipelines. The other soil types that would be traversed by the brine pipelines all have lower potentials for rapid permeability than the Holtville silty clay, wet soil type.

To ensure proper handling of the brines, the applicant has proposed two primary mitigation measures. For more information, please refer to the **Mitigation** discussion below.

Please also refer to the **Waste Management** section for further discussion of brine handling issues.

Waste Injection

The applicant is proposing to inject cooling tower blowdown, spent brine, and other process wastewaters back into the geothermal aquifer. The regulations under the Resource Conservation Recovery Act (40 CFR 261.4(b)) exempt “drilling fluids, produced waters, and other water associated with development and production of crude oil, natural gas, or geothermal energy” from the definition of hazardous waste. Furthermore, because the aquifer is valuable only for purposes of geothermal energy production, Staff would not expect any significant impacts resulting from reinjection of these streams. Injection of these streams would also serve to replenish the geothermal supply. Please refer to the finding of sufficient geothermal resource for the project (CEC 2003b) for further information.

Class V geothermal injection wells are regulated by the EPA, but authority is delegated to the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) in California.

Production and Injection Well Drilling and Design

The drilling and design of the production and injection wells present a high potential for local water quality impacts. Proper methods must be employed to satisfy DOGGR regulations to protect the well and the surrounding environment.

Production wells would be drilled as follows:

A 30-foot length of 36-inch conductor pipe would be set in place. A 36-inch hole would be drilled to a depth of approximately 400 feet below ground surface (bgs), and a 30-inch casing would be cemented in that hole. A 30-inch hole would be drilled to a depth of approximately 1,400 feet, and a 24-inch casing would be cemented in that hole. This method of overlapping casings would provide protection for the surrounding soils and ground water from 400 to 1,400 feet bgs with one string of casing, and the soils and ground water from 0 to 400 feet bgs with two strings of casing.

Before the drill bit nears the geothermal reservoir the shallow sands are sealed and protected (CEOE 2002e, p. WATER-3). A 22-inch hole would be drilled to 2,625 feet bgs, the top of the geothermal reservoir, and a 16-inch casing would be cemented in

place. At this point, the soil from 0 to 400 feet bgs would be protected with three strings of casing, soil from 400 to 1,400 feet bgs would be protected with two strings of casing, and 1,400 to 2,625 feet bgs would be protected with one string of casing as the drilling continues into the geothermal reservoir. A 13-3/8-inch titanium casing would be cemented in place to a depth of approximately 2,570 feet bgs to complete the process.

This process would leave the geothermal reservoir open to the wellbore, 1,400 to 2,570 feet bgs protected by two strings of casing, 400 to 1,400 feet bgs protected by three strings, and the top 400 feet protected by 4 strings. The full depth of 2,570 feet bgs would be protected by the titanium casing.

Injection wells would be drilled and constructed in a similar manner, but with smaller casings and to a deeper distance below ground surface. The injection wells would consist of a 30-inch string to 30 feet bgs, a 24-inch string to 500 feet bgs, an 18-5/8-inch string to 1,800 feet bgs, and a 13-3/8-inch string to 3,600 feet bgs. The open borehole would extend only in the geothermal reservoir, from approximately 3,600 feet bgs to 8,600 feet bgs. The injection wells would have a replaceable 10-3/4-inch carbon steel liner hung in the well from ground surface to 3,600 feet bgs.

The method of drilling and design of the wells would sufficiently protect the surrounding environment and comply with relevant Public Resources Code regulations. The project would be required to receive an Underground Injection Control (UIC) permit from DOGGR prior to operation of the injection wells. This requirement would be included in a **Condition of Certification** to assure proper mitigation of injection would occur.

Brine Ponds

Occasionally, the project may encounter upset conditions, which are described in Data Response 82 (CEOE 2002I) as events such as major vessel leak until isolation is achieved, loss of solids removal capability, or draining of major vessels for maintenance. During these periods, the spent brine would be pumped to the two brine ponds. Because of the chemical characteristics of the spent brine (TDS approximately 316,000 mg/L), a release of this brine into the local ground water aquifers could significantly impact local ground water quality. To minimize the chance of release through seepage, the applicant has proposed high-density polyethylene (HDPE) liners for the ponds. The applicant would also be required to observe all Title 27 regulations related to waste management units and would be required to receive Waste Discharge Requirements from the CRBRWQCB, who retains authority for permitting the ponds. The applicant has initiated coordination with the CRBRWQCB to ensure that the permitting process would not significantly delay the project if it is licensed. For more information, please refer to the **Mitigation** discussion below.

Stormwater Runoff

As discussed above under **Surface Hydrology**, the SSU6 Project would be required to comply with the NPDES requirements that regulate storm water by establishing effluent limitations and monitoring and reporting requirements for construction activities stormwater, and industrial activities (operational) stormwater general permits. Stormwater would be routed to the 4.4-acre-foot capacity detention pond on-site for percolation and/or evaporation. Stormwater with the potential to encounter oil

contamination would be routed to the oil/water separator prior to discharge to the detention pond.

The project owner would be required to develop a Storm Water Pollution Prevention Plan and an Erosion and Sedimentation Control Plan to mitigate impacts to water quality from spills or sedimentation. Implementation of these plans would result in no significant impacts to water quality. Refer to **Conditions of Certification SOIL & WATER-1, 2 and 3** for more information.

Road Widening and Pipeline Installation Activities

Road widening activities could result in sedimentation or other water quality threats.

The project would require widening of the existing access road to Obsidian Butte and the installation of a pipeline crossing. In order to provide a route for drilling rigs to get to Obsidian Butte, the 10-foot road surface would have to be widened by 15 feet, making the road 25-feet wide.

A pipeline to bring the produced brine to the site would follow a similar route, requiring disturbance of a 600-foot length of land along the south side of the widened road. Twenty pipe supports would be required, installed at intervals of 30 feet.

These activities would impact 0.05 acres of brackish marsh, 0.03 acres of other waters of the U.S., 0.02 acres of desert sink scrub, and 0.33 acres of tamarisk scrub, and would result in the creation of 81 cubic yards of fill.

The applicant has applied for a Clean Water Act Section 404 Permit with the U.S. Army Corps of Engineers to regulate these activities. The applicant would be required to receive these permits prior to site mobilization. The Army Corps has indicated that the permit would not be completed until the applicant has provided a conceptual mitigation plan (Baker, 2003).

The applicant has also applied for a Clean Water Act Section 401 Permit with the CRBRWQCB to assure that any sedimentation or other water quality threats that may arise during road widening activities or pipeline installation would be adequately addressed and properly mitigated.

Please refer to the **Biological Resources** section of this document and the **Mitigation** discussion for more information.

Domestic Waste

Domestic and sanitary waste would be directed to a septic tank. This tank would be pumped out as necessary. There are no domestic-use ground water wells in the project area. Staff does not expect significant impacts to water quality resulting from the septic waste system. Please refer to **Condition of Certification SOIL & WATER-11** for more information.

CUMULATIVE IMPACTS

Surface Hydrology

As described above in the **Direct and Indirect Impacts** discussion, the SSU6 Project would be required to comply with the general NPDES requirements that establish storm water effluent limitations and monitoring and reporting requirements for construction and operation activities. Storm Water Pollution Prevention Plans reviewed and approved by the CEC CPM would be required prior to the start of construction or operation activities. Compliance with these requirements in addition to the project's proposed design should avoid any significant cumulative impacts to surface hydrology.

In addition, the project would be improving an existing eight-foot berm surrounding the project site. As such, the project would not add any new diversions or impediments to the 100-year flood plain that are not already in place. No significant cumulative impacts for downstream or on-site flooding are expected.

Groundwater

Water supply provided by local ground water has not been proposed. Therefore, the SSU6 Project should have no significant cumulative impact on ground water resources.

Soil Erosion and Sedimentation

Construction and operational activities related to the SSU6 Project may cause an increase in cumulative wind and water erosion to soils affected by these activities. However, implementation of the NPDES stormwater requirements described above in the **Direct and Indirect Impacts** discussion would ensure that the SSU6 Project would not result in significant cumulative erosion and sedimentation impacts.

Water Supply

Based on the uncertainty of the current fresh water situation in the region, staff believes undue strain on local fresh water resources could become a cumulative impact.

Built-in measures to mitigate any further strain in fresh water use caused by the project consist of taking currently irrigated agricultural lands out of production. Historical water use at the site is approximately 865 AFY. The project would use 293 AFY of fresh water supplied by IID on an average annual basis, meaning that during average annual conditions, the project would conserve approximately 572 AFY of IID fresh water by taking previously irrigated land out of agricultural production.

Staff is currently consulting with IID to obtain historical water use information for the project site in order to establish an appropriate CEQA baseline for water supply purposes. Staff is also coordinating with IID to determine what, if any, impacts would result from the applicant exceeding historical use at the site, forcing payment for Conservation Plan activities as specified by the applicant's contract with IID. Until this information has been submitted and analyzed, Staff cannot make a final recommendation on this issue.

Water Quality

Improper wastewater disposal or handling can lead to soil, surface and ground water degradation, and impairment of beneficial uses. However, the design and mitigation proposed by both staff and the applicant should prevent further degradation of already impacted surface and groundwater supplies. Staff does not anticipate cumulative impacts to water quality resulting from the SSU6 project.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the Minority population is greater than fifty percent within a six-mile radius of the proposed Salton Sea Unit #6 power plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius.

At this point, staff has not yet completed analysis of the SSU6 project with respect to fresh water supply. However, it is likely that any potential impact to fresh water supply would not fall disproportionately on minority populations or populations below the poverty level. Even if significant impacts to fresh water supply were identified, those impacts would likely be spread equally to all customers across IID's delivery zone.

FACILITY CLOSURE

The SSU6 Project is expected to operate for a minimum of 30 years. Closure options range from "mothballing", with the intent of restart at some time, to the removal of all equipment and facilities.

The facility closure plan would be submitted to the California Energy Commission for approval prior to decommissioning. Compliance with all applicable LORS, and any local and/or regional plans would be required. The plan would be required to address all concerns regarding soil and water resources.

COMPLIANCE WITH LORS

The project is expected to comply with all relevant LORS. Staff's determination will be presented in the Final Staff Assessment.

MITIGATION

APPLICANT PROPOSED MITIGATION

In the AFC and subsequent filings the applicant has proposed mitigation measures regarding Soil and Water Resources as follows:

Surface Hydrology

All on-site stormwater would be routed to the 4.4-acre-foot capacity detention pond. All stormwater flows with the potential to encounter oil contamination would be routed to an

oil/water separator prior to discharge to the ponds. The applicant would be required to meet general stormwater requirements of the NPDES permits. The requirement for construction is contained in **Condition of Certification SOIL & WATER-1**, and the requirement for operation is required in **Condition of Certification SOIL & WATER-2**.

Ground Water

The applicant has proposed the use of Best Management Practices (BMPs) for spill prevention and control in the Draft Stormwater Pollution Prevention Plan (SWPPP) to minimize the potential for groundwater contamination (CEOE 2002I, Attachment SW-70A). This mitigation would be included in **Conditions of Certification SOIL & WATER-1 and 2**.

The design and installation of production and injection wells would be conducted in a manner to protect local ground water resources. Please refer to the **Staff Proposed Mitigation – Water Quality** discussion for more information.

Soil Erosion and Sedimentation

The applicant would incorporate standard BMPs into the project design for construction and operation to mitigate erosion and sedimentation impacts. This mitigation would be contained in the SWPPP requirements for the project, as described above in the **Surface Hydrology** discussion above. Please refer to the **Staff Proposed Mitigation** discussion for erosion and revegetation requirements.

Road widening and pipeline installation activities would require Section 401 and Section 404 permits from the CRBRWQCB and U.S. Army Corps of Engineers, respectively. The applicant has filed applications for both of these permits. Please refer to **Conditions of Certification SOIL & WATER-4 and 5** for more information. Please refer to the **BIOLOGICAL RESOURCES** section of this document for more information regarding mitigation for these activities.

Water Quality

All on-site stormwater would be routed to the 4.4-acre-foot capacity detention pond. All stormwater flows with the potential to encounter oil contamination would be routed to an oil/water separator prior to discharge to the ponds. The applicant has proposed the use of BMPs for spill prevention and control in the Draft Stormwater Pollution Prevention Plan (SWPPP) to minimize the potential for groundwater contamination (CEOE 2002I, Attachment SW-70A). The applicant would be required to meet general stormwater requirements of the NPDES permits for construction and operation. Please refer to **Conditions of Certification SOIL & WATER-1 and 2** for more information.

The applicant proposes a brine pond design that includes liners with the base of the ponds at least five feet from the highest water elevation, as Title 27 regulations require. The applicant has also proposed installation of monitoring wells to monitor and assess potential releases to local groundwater. This design is in accordance with the regulations that govern such ponds. **Condition of Certification SOIL & WATER-8** requires the applicant to receive final Waste Discharge Requirements from the CRBRWQCB prior to discharge to the brine ponds. The applicant proposes that the

production and injection pipelines be constructed of polymer concrete-lined carbon steel to prevent accidental releases of geothermal fluids. The applicant also proposes that pipelines at each production wellhead be equipped with alloy isolation valves on either side of an alloy emergency shut-off valve to prevent accidental releases.

The applicant has applied for a Clean Water Act Section 404 Permit with the U.S. Army Corps of Engineers to regulate road widening and pipeline installation activities across nearby wetlands. The applicant would be required to receive these permits prior to site mobilization. The U.S. Army Corps of Engineers has indicated that the permit would not be completed until the applicant has provided a conceptual mitigation plan (Baker, 2003).

The applicant has also applied for a Clean Water Act Section 401 Permit with the CRBRWQCB to assure that any sedimentation or other water quality threats that may arise during road widening activities or pipeline installation would be adequately addressed and properly mitigated.

Please refer to **Conditions of Certification SOIL & WATER-4 and 5** for more information.

The applicant has proposed the installation of a monitoring well 100 feet west of the northwest corner of the 80-acre plant site. This well could be used to monitor or assess potential releases from the proposed septic system. Proper installation and operation of the septic system is addressed in **Condition of Certification SOIL & WATER-11**.

STAFF PROPOSED MITIGATION

Soil Erosion and Sedimentation

In addition to measures proposed by the applicant, Staff would require the design and implementation of a Drainage, Erosion Control and Revegetation Plan to assure restoration of soils disturbed during the construction and/or operation of the SSU6 Project. This requirement is addressed in **Condition of Certification SOIL & WATER-3**.

Water Supply

The applicant has proposed to store the project's fresh water supply in a lined earthen surface pond and estimated an average loss of approximately 20 AFY and a maximum loss of approximately 30 AFY to evaporation due to high temperatures in the region. Staff believes that such loss would be unnecessary and avoidable. **Condition of Certification SOIL & WATER-6** requires the applicant to construct a closed storage water tank to avoid unnecessary waste of water to the atmosphere, designed to hold a 6-day water supply buffer as required by IID regulations.

Because the applicant has not proposed any water supply outside of that provided by IID, staff has not analyzed alternative water supplies for the SSU6 Project. Staff will be recommending **Condition of Certification SOIL & WATER-12** to prevent usage of other supplies that were not analyzed and therefore could possibly have unmitigated impacts.

Water Quality

As discussed in the Applicant Proposed Mitigation discussion above, the applicant would be required to obtain a Section 404 permit from the U.S. Army Corps of Engineers to permit fill placed in wetlands resulting from road widening and pipeline installation activities. The Army Corps has stated that a conceptual plan for wetland compensation is required to complete the permit. **Condition of Certification SOIL & WATER-4** requires submission of copies of the Section 404 permit prior to commencement of those activities. Please refer to the **BIOLOGICAL RESOURCES** section of this document for more information.

Similarly, the applicant would be required to obtain a Section 401 certification from the Regional Water Quality Control Board to address potential impacts to wetlands due to the road widening and pipeline installation activities. **Condition of Certification SOIL & WATER-5** requires a copy of this certification to be submitted prior to commencement of those activities.

Class V geothermal injection wells are regulated by the EPA, but authority is delegated to the Department of Oil, Gas, and Geothermal Resources (DOGGR) in California. The project would be required to receive an Underground Injection Control (UIC) permit from DOGGR prior to operation of the injection wells. This requirement is addressed in **Condition of Certification SOIL & WATER-7** to assure proper mitigation of injection and proper documentation of the well activities would occur.

Condition of Certification SOIL & WATER-8 requires the applicant to receive final Waste Discharge Requirements from the CRBRWQCB prior to discharge to the brine ponds. Staff, in consultation with CRBRWQCB Staff, would extend this requirement to cover mud sumps associated with drilling activities. WDRs for the mud sumps must be obtained prior to drilling activities requiring these sumps. This requirement is addressed in **Condition of Certification SOIL & WATER-9**.

While project elements and design minimize the potential for brine releases to the environment, the applicant must be prepared in the event an accidental release should occur. **Condition of Certification SOIL & WATER-10** requires the applicant to develop and implement an Emergency Response Plan to notify appropriate agencies and mitigate any potential impacts resulting from an accidental brine release.

CONCLUSIONS AND RECOMMENDATIONS

Staff has not completed the Soil and Water Resources analysis of the SSU6 Project. Additional information is needed regarding the fresh water supply for the project before staff can complete its analysis. Staff is coordinating with IID to obtain more recent water delivery data to establish a more applicable baseline against which the proposed fresh water usage will be compared. Staff is also coordinating with IID to determine what, if any, impacts would result from the applicant exceeding historical use at the site, forcing payment for Conservation Plan activities as specified by the applicant's contract with IID. Staff will continue to coordinate with the RWQCB to identify and mitigate any potential impacts to water quality. At this time, considering the information that staff has

analyzed, the project does not appear to cause significant impacts. However, staff will reserve final recommendation for the Final Staff Assessment.

CONDITIONS OF CERTIFICATION

SOIL & WATER-1: The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the entire project. Prior to beginning any site mobilization associated with any project element, the project owner shall submit to the CPM a copy of the Notice of Intent for Construction accepted by the Colorado River Basin RWQCB and obtain Energy Commission CPM approval of the construction activity SWPPP for SSU6.

Verification: No later than 60 days prior to the start of site mobilization for any project element, the project owner shall submit a copy of the SWPPP required under the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity to Imperial County for review and comment, and to the CPM for review and approval. The SWPPP will include copies of the Notice of Intent for Construction accepted by the RWQCB and any permits for SSU6 that specify requirements for the protection of stormwater or water quality. Approval of the SWPPP by the CPM must be obtained prior to site mobilization for any project element.

SOIL & WATER-2: The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of SSU6. The project owner shall submit to the CPM a copy of the Notice of Intent for Operation accepted by the Colorado River Basin RWQCB and obtain approval of the General Industrial Activities SWPPP from the Energy Commission CPM prior to commercial operation of the SSU6.

Verification: No later than 60 days prior to the start of commercial operation, the project owner shall submit to the CPM a copy of the SWPPP required under the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity to Imperial County for review and comment, and to the CPM for review and approval. The operational SWPPP shall include copies of the Notice of Intent for Operation accepted by the RWQCB and any permits for SSU6 that specify requirements for the protection of stormwater or water quality. Approval of the operational SWPPP by the CPM must be obtained prior to start of commercial operation.

SOIL & WATER-3: Prior to beginning any site mobilization activities for any project element, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion and Sedimentation Control Plan that addresses all project elements. The plan shall address revegetation and be consistent with the grading and drainage plan as required by **Condition of Certification CIVIL-1**.

Verification: No later than 60 days prior to the start of any site mobilization for any project element, the project owner shall submit the Drainage, Erosion and Sedimentation Control Plan to the CPM for review and approval. No later than 60 days prior to start of any site mobilization, the project owner shall submit a copy of the plan to Imperial County for review and requesting any comments be provided to the CPM within 30 days. The plan must be approved by the CPM prior to start of any site mobilization activities.

SOIL & WATER-4: Prior to the start of site mobilization activities associated with any project element, including linear and off-site facilities, the project owner shall obtain a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers for the road widening and pipeline installation between the west end of McKendry Road and Obsidian Butte.

Verification: No later than thirty (30) days prior to the start of site mobilization activities associated with any project element, including linear and off-site facilities, the project owner shall submit to the CPM a copy of the Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers for the project.

SOIL & WATER-5: Prior to the start of site mobilization activities associated with any project element, including linear and off-site facilities, the project owner shall obtain a Section 401 Certification from the Colorado River Basin RWQCB for the road widening and pipeline installation between the west end of McKendry Road and Obsidian Butte.

Verification: No later than thirty (30) days prior to the start of site mobilization activities associated with any project element, including linear and off-site facilities, the project owner shall submit to the CPM a copy of the Section 401 Certification from the Colorado River Basin RWQCB for the project.

SOIL & WATER-6: The project owner shall install a closed storage tank in lieu of the proposed open service water pond for fresh water storage. This tank should provide the same function as the proposed service water pond.

Verification: No later than thirty (30) days prior to power plant operation, the project owner shall provide verification that construction of such tank has been completed to the Energy Commission CPM. Verification must be received prior to power plant operation. .

SOIL & WATER-7: The project owner shall provide a copy of the Underground Injection Control (UIC) permit issued by the California Department of Oil, Gas, and Geothermal Resources (DOGGR) for the construction and operation of the brine and wastewater disposal injection wells. The project shall not construct or discharge to these wells without the final permit in place or without emergency/temporary authorization from DOGGR or U.S. EPA Region IX. The project shall provide on a continuing basis, copies of all monitoring or other reports, as well as any changes made to the permit by DOGGR related to the operation of these wells.

Verification: No later than fifteen (15) days prior to the construction of the injection wells, the project owner shall submit copies of the final UIC permit to the CPM. All copies of permit changes and monitoring or other reports must be received within thirty (30) days of their submittal to DOGGR.

SOIL & WATER-8: The project owner shall obtain Waste Discharge Requirements (WDRs) issued by the Colorado River Basin RWQCB for the operation of the project's brine ponds.

Verification: No later than sixty (60) days prior to any wastewater discharge to the brine ponds, the project owner shall obtain and provide a copy of the WDRs issued by the Colorado River Basin RWQCB for the project's discharge to the brine ponds to the CPM. Any change to the design, construction, or operation of the ponds permitted by the WDRs will be noticed in writing to both the CPM and the Colorado River Basin RWQCB during both construction and/or operation. The project owner will notify the Energy Commission in writing of any changes to the WDRs that are instituted by either the project owner or the Colorado River Basin RWQCB, including WDRs permit renewal. The project owner will provide the CPM with the annual monitoring report summary required by the WDRs, and will fully explain any violations, exceedances, enforcement actions, or corrective actions.

SOIL & WATER-9: The project owner shall obtain Waste Discharge Requirements (WDRs) issued by the Colorado River Basin RWQCB for the project's mud sumps.

Verification: No later than thirty (30) days prior to the use of mud sumps associated with drilling activities, the project owner shall obtain and provide a copy of final WDRs issued by the Colorado River Basin RWQCB for the project's mud sumps to the CPM. Any change to the design, construction, or operation of the mud sumps permitted by the WDRs will be noticed in writing to both the CPM and the Colorado River Basin RWQCB during their use. The project owner will notify the Energy Commission in writing of any changes to the WDRs that are instituted by either the project owner or the Colorado River Basin RWQCB. The project owner will provide the CPM with any reporting or monitoring required by the WDRs, and will fully explain any violations, exceedances, enforcement actions, or corrective actions.

SOIL & WATER-10: Prior to production of brines from the geothermal aquifer, the project owner shall receive approval for an Emergency Response Plan in consultation with appropriate agencies to ensure proper notification and mitigate any potential impacts resulting from an accidental brine release.

Verification: No later than thirty days (30) days prior to production of brines from the geothermal aquifer, the project owner shall consult with appropriate agencies and submit an Emergency Response Plan to the CPM for approval. Approval of the final plan by the Energy Commission CPM must be obtained prior to the production of brines from the geothermal aquifer.

SOIL & WATER-11: The on-site septic system shall be designed according to the applicable county standards. The project owner shall submit the final designs for

the septic system to the CPM for review and approval, and to the Imperial County Department of Health Services for comment.

Verification: No later than thirty (30) days prior to commencement of septic system construction activities, the project owner shall submit the final designs for the septic system to the CPM for review and approval, and to the Imperial County Department of Health Services for comment. The project owner must obtain CPM approval of the final plans prior to commencement of septic system construction activities.

SOIL & WATER-12: The project shall not use any fresh water supplies in addition to water supplied by IID as proposed during these proceedings.

Verification: After operation has begun, the project owner shall provide to the CPM in the annual compliance report a record of the monthly IID fresh water deliveries to the project. The project owner must file an amendment with the CPM should another source of fresh water be deemed necessary.

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TRAFFIC AND TRANSPORTATION

Ken Peterson

INTRODUCTION

In the Traffic and Transportation section, staff addresses the extent to which the project may impact the transportation system within the vicinity of the proposed Salton Sea Unit 6 project (SSU6). The influx of large numbers of construction workers can, over the course of the construction phase, increase roadway congestion and also affect traffic flow. In addition, the transportation of large pieces of equipment can impact roadway congestion and safety. The construction of linear facilities can temporarily disrupt traffic flows when trenching across roadways. Potential impacts related to traffic operations and safety hazards resulting from the construction and operation of the project are discussed below.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

LORS that are applicable to the proposed project are listed below. Regulations related to the transportation of hazardous materials, which are designed to control and mitigate for potential impacts are included.

FEDERAL

The federal government addresses transportation of goods and materials in Title 49, Code of Federal Regulations:

- Title 49, Code of Federal Regulations, sections 171 through 177, governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- Title 49, Code of Federal Regulations, sections 350 through 399, and Appendices A-G, Federal Motor Carrier Safety Regulations, addresses safety considerations for the transport of goods, materials, and substances over public highways.
- Title 14, Code of Federal Regulations, Section 77.13(2)(I), requires an Applicant to notify the FAA of construction of structures with a height greater than 200 feet from grade or greater than an imaginary surface extending outward and upward at a slope of 10 to 1 from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet long (CE Obsidian 2002a p. 5.10-14).

STATE

The California Vehicle Code and the Streets and Highways Code contain requirements applicable to the licensing of drivers and vehicles, the transportation of hazardous materials, and rights-of-way. The California Health and Safety Code addresses the transportation of hazardous materials. Specific provisions include:

- California Vehicle Code section 353 defines hazardous materials.
- California Vehicle Code sections 31303 through 31309 regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.

- California Vehicle Code sections 31600 through 31620 regulate the transportation of explosive materials.
- California Vehicle Code sections 32000 through 32053 regulate the licensing of carriers of hazardous materials and includes noticing requirements.
- California Vehicle Code sections 32100 through 32109 establish special requirements for the transportation of inhalation hazards and poisonous gases.
- California Vehicle Code sections 34000 through 34121 establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- California Vehicle Code sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5- 7, 34506, 34507.5 and 34510-11 regulate the safe operation of vehicles, including those which are used for the transportation of hazardous materials.
- California Health and Safety Code section 25160 et seq., addresses the safe transport of hazardous materials.
- California Vehicle Code sections 2500 through 2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials including explosives.
- California Vehicle Code sections 13369, 15275, and 15278 address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. In addition, it requires the possession of certificates permitting the operation of vehicles transporting hazardous materials.
- California Streets and Highways Code sections 117 and 660 through 672 and California Vehicle Code section 35780 et seq., require permits for the transportation of oversized loads on county roads.
- California Vehicle Code sections 35550 through 35559 impose gross weight limits upon the highway by requiring that the wheels on any one axle of a vehicle shall not exceed 18,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway, by the wheels on any front steering axle of a motor vehicle, shall not exceed 12,500 pounds. The maximum allowable gross combination weight is 80,000 pounds.
- California Street and Highways Code sections 660, 670, 1450, 1460 et seq., 1470, and 1480 regulate right-of-way encroachment and the granting of permits for encroachments on state and county roads.
- In addition all construction within the public right-of-way must comply with the manual of traffic controls for construction and maintenance of work zones (California Department of Transportation, 1996).local

Imperial County Airport Land Use Commission

The Imperial County Airport Land Use Commission (ALUC) reviews all land developments affecting airspace, and makes advisory determinations to local

jurisdictions on developments' consistency with the County Airport Land Use Compatibility Plan.

Imperial County General Plan

Circulation and Scenic Highways Element

The project is located within the unincorporated area of Imperial County; therefore the County General Plan is relevant. The general plan's Circulation and Scenic Highways Element, which was revised May 16, 1993, is relevant to the traffic and transportation analysis. The following circulation goal and objective are relevant to SSU6:

- Goal 1 The County will provide an integrated transportation system for the safe and efficient movement of people and goods within and through the County of Imperial with minimum disruption to the environment. (Imperial County 1993a p. 29)
- Objective 1.3 Ensure safe and coordinated traffic patterns, contiguous growth, and promote a planned and consistent development around city/township areas. (Imperial County 1993a p. 29)

The following implementation programs and policies are relevant to SSU6:

IVB1d The County's goal for an acceptable traffic service standard during AM and PM peak periods shall be Level of Service (LOS) C for all arterial and street links and LOS C for all intersections. (Imperial County 1993a p. 34)

IVB1f The County may permit construction of private streets within individual development projects....(Imperial County 1993a p. 35)

Excerpt from IVB2: Requiring the dedication of right-of-way and street improvement as a condition of issuance of a Building Permit should be required, at least for any development in multiple family, commercial, and industrial zones. (Imperial County 1993a p. 36)

Excerpt from IVB6b: The County shall prohibit the use of public streets for freight loading and unloading. (Imperial County 1993a p. 40)

Excerpt from IVB7b: The County shall encourage the use of railroad freight service to minimize long haul truck traffic by providing efficient rail freight loading access facilities. (Imperial County 1993a p. 41)

Geothermal/Transmission Element

The Geothermal and Transmission Element is an optional element of the Imperial County General Plan that provides a framework for the review and approval of geothermal projects in the County. This Element contains the following goal:

- Goal 1: The County of Imperial supports and encourages the full, orderly, and efficient development of geothermal resources while at the same time preserving and enhancing where possible agricultural, biological, human, and recreational resources. (Imperial County 1998 p. 14)

Imperial County Zoning Ordinance

The County zoning ordinance requires a building permit for power plants. The County would require a building permit for SSU6 if it were not for the preemptive jurisdiction of the Energy Commission provided in the Warren-Alquist Act. The building permit for the project would include street improvement conditions. See the Facility Design section of this SA for a condition that requires compliance with County building permit requirements.

SETTING

REGIONAL DESCRIPTION

SSU6 is planned for a cultivated 80-acre site within a 160-acre parcel located 1,000 feet southeast of the Salton Sea and the Sonny Bono Salton Sea National Wildlife Refuge. The project's boundaries would be principally Severe Road to the west, McKendry Road to the north, Boyle Road to the east, and Peterson Road to the south. There are nine geothermal power plants presently within nine miles of the SSU6 site. The land in the SSU6 site vicinity is used for wild life habitat, agriculture, and geothermal energy production.

TRAFFIC AND TRANSPORTATION FIGURE 1 (CE Obsidian 2002a Figure 5.10-1) shows the site and surrounding area. Access to the site vicinity is provided from State Highway (SH) 111 by traveling west on Sinclair road and south on Gentry Road, west on McKendry Road, and south on Boyle Road. Access to the site would be provided by a proposed private access road west from Boyle Road. Descriptions of relevant roads and highways in the study area are provided below.

Freeways and Local Roadways

SH-111, located about 6 miles to the east of the project site, carries an average of 7,000 vehicles per day between Sinclair Road and SH -115 (CE Obsidian 2002a Table 5.10-1).

SH-78/-86, located to the south of the project site, carries an annual average of 8,100 vehicles per day between B Street and Center Street and 13,000 vehicles per day between Center Street and H Street (CE Obsidian 2002a Table 5.10-1).

Sinclair Road is classified as a two-lane collector between Severe and Gentry Roads, and carries an average of 1,160 vehicles per day between these points (CE Obsidian 2002a Table 5.10-3).

Gentry Road is classified as a two-lane collector between Sinclair and Lindsey Roads, and carries an average of 1,350 vehicles per day between these points (CE Obsidian 2002a Table 5.10-3).

Boyle Road is classified as a local two-lane between McKendry and Peterson Roads, and carries an estimated average of 100 vehicles per day between these points (CE Obsidian 2002a Table 5.10-3).

McKendry Road is classified as a local two-lane between Severe and Gentry Roads, and carries an average of 53 vehicles per day between these points (CE Obsidian 2002a Table 5.10-3).

Airports

The nearest airport is the Calipatria Municipal Airport in Calipatria, approximately six miles southeast of the SSU6 site. There are also airports in Brawley, the City of Imperial, and El Centro.

Public Transportation: There are no public transit routes within three miles of the project site, and there are no plans for public transit expansion in the project vicinity (CE Obsidian 2002e p. TRA-1).

Bicycle Facilities: The Imperial County Bicycle Master Plan proposes countywide Class I, II, and III bicycle routes. In the project vicinity there is a Class II bicycle route that travels in part along the project construction route path on Sinclair and Gentry Roads. A Class II bicycle route is defined by the Bicycle Master Plan as part of the roadway or shoulder as marked by pavement markings or barriers. Vehicle parking, crossing, or turning movements are permitted within the Class II Bicycle Route (CE Obsidian 2002a p. 5.10-3). There are no bicycle pavement barriers on Sinclair and Gentry Roads along the project construction truck routes. Staff's field observations of roads in the vicinity indicated little or no bicycle traffic.

Planned Roadway and Transit Improvements

The County does not anticipate any road projects in the next few years within six miles of the project site (Jorgenson). The California Department of Transportation (Caltrans) has plans for three road improvement projects in the region (Cartagena):

- 1) SR-78/86: Widen shoulders on SR-86 to just south of Legion Road
Start-Summer 2003
End- Summer 2004
- 2) Construct 4 lane express way near Brawley from Fredricks Road on SR-86 to north of Mead Road on SR-111
Start- Fall 2003
End- information not available
- 3) SR-111: Construct 4.5 miles 4 lane expressway on SR-111 near Brawley from Worthington Road to Keystone Road
Start- currently under construction
End- Fall 2003

Caltrans also owns a 240-acre mitigation parcel next to the Salton Sea National Wildlife Refuge. Staff does not expect this mitigation parcel to be a source of construction traffic. Staff has concern with Caltrans projects #2 and #3 above because of the possible obstruction of project construction truck routes. The applicant has not yet replied to staff's request for comment on this concern.

Truck Traffic

Vehicle classification counts indicate that along the expected project construction truck route, trucks currently comprise approximately 32 percent of the total traffic volume on Sinclair and Gentry Roads, and 22 percent along Boyle Road (CE Obsidian 2002e p. TRA-2). Truck traffic on SH-111 from Sinclair Road to SH-115 is 21 percent of the total, and on SH-78/86 from B Street to H Street in Westmoreland is from 25 to 40 percent (CE Obsidian 2002a Table 5.10-1, p. 5.10-21).

Current Intersection and Roadway Operating Conditions

Intersections are usually the critical elements of the roadway system when assessing adequate travel capacity, maximizing safety, and minimizing environmental impacts. The operating conditions of a roadway system, including intersections, are described using the term "level of service" (LOS). LOS is a description of a driver's experience at an intersection or roadway based on the level of congestion (delay). However, it is not a measure of safety or accident potential. LOS can range from "A," representing free-flow conditions with little or no delay, to "F," representing saturated traffic conditions with substantial delay.

The County has set LOS C as a goal for a minimally acceptable traffic service standard during AM and PM peak periods for all arterial and street links, and for all intersections. The County's implementation policy for this standard includes placing the major responsibility of the associated costs of improvements with the developers of new land development projects (Imperial County 1993a p. 34).

The existing conditions on portions of highways and local roadways that will be most affected by the expected construction traffic and the current peak hour traffic levels are shown in **TRAFFIC AND TRANSPORTATION Table 1** (CE Obsidian 2002a Table 5.10-1) and **Table 2** (CE Obsidian 2002a Table 5.10-3). During peak hours LOS A is achieved in all of these areas of concern. Existing traffic conditions at intersections in the project area are shown in **TRAFFIC AND TRANSPORTATION Table 3** (CE Obsidian 2002a Table 5.10-4). During peak hours the lowest level of service at any of these intersections is LOS B

Traffic and Transportation Table 1
Existing Traffic Characteristics of Highways in the Project Area

| Highway | Location | Annual Average Daily Traffic ⁽¹⁾ | Peak Hour Traffic ⁽¹⁾ | Annual Average Daily Truck Traffic ⁽²⁾ | Truck Traffic % of Total ⁽³⁾ | LOS ⁽⁴⁾ |
|----------|--|---|----------------------------------|---|---|--------------------|
| SH-78/86 | B Street to Center Street (Forrester Road) | 8,100 | 710 | 3,200 | 40% | A |
| SH-78/86 | Center Street (Forrester Road) to H Street | 13,000 | 1,150 | 3,290 | 25% | A |
| SH-111 | Sinclair Road to SH-115 (East) | 7,000 | 690 | 1,477 | 21% | A |

1 Source: 2000 Traffic Volumes on the California State Highway System (Caltrans, 2001).

2 Source: 2000 Truck Volumes on the California State Highway System (Caltrans, 2001).

3 Percentages calculated using 2000 average daily truck traffic as a percentage of 2000 AADT.

4 LOS = level of service. LOS from Highway Capacity Software (HCS): Multilane Highways Release 4.1 (see Table 5.10-2).

Traffic and Transportation Table 2
Existing Traffic Characteristics of Local Roadways in the Project Area

| Roadway | Location | Classification | Average Daily Traffic | Level of Service C Capacity | LOS ⁽³⁾ |
|------------------------------|---|-------------------|-----------------------|-----------------------------|--------------------|
| Sinclair Road ⁽¹⁾ | Between SH-111 and Gentry road | Collector, 2-lane | 1160 | 7,100 | A |
| McKendry Road ⁽²⁾ | Between Severe Road and Gentry Road | Local, 2-lane | 53 | 4,500 | A ⁽⁴⁾ |
| Lindsey Road ⁽²⁾ | Between Gentry Road and Severe Road | Local, 2-lane | 823 | 4,500 | A ⁽⁴⁾ |
| Eddins Road ⁽¹⁾ | Between SH-111 and Gentry Road | Collector, 2-lane | 1354 | 7,100 | A |
| Severe Road ⁽²⁾ | Between McKendry Road and Lindsey Road | Local, 2-lane | 52 | 4,500 | A ⁽⁴⁾ |
| Boyle Road ⁽⁵⁾ | Between McKendry Road and Peterson Road | Local, 2-lane | 100 (est.) | 4,500 | A ⁽⁴⁾ |
| Gentry Road ⁽¹⁾ | Between Sinclair Road and Lindsey | Collector, 2-lane | 1350 | 7,100 | A |

1 From Imperial County Traffic Count Database

2 New counts taken on January 2002

3 LOS from Imperial County Standard Street Classification (Table 4 Circulation/Open Space Element)

4 According to the Circulation/Open Space Element (Table 4), the Level of Service concept is not applied to residential streets because their primary purpose is to serve abutting lots, not to carry through traffic. Level of service normally applies to roads carrying through traffic.

5 Estimated counts approximately double Severe Road counts, taken on January 2002.

Traffic and Transportation Table 3
Existing Traffic characteristics of Intersections in the Project Area¹

| Intersection | Signal Control | AM Peak Hour | | | PM Peak Hour | | |
|---------------------------------|----------------|--------------|-------|-------|--------------|-------|-------|
| | | LOS | Delay | V/C | LOS | Delay | V/C |
| Gentry Road/McKendry Road | Unsignalized | A | 9.6 | *** | A | 8.8 | *** |
| Gentry road/Lindsey Road | Unsignalized | A | 9.6 | *** | A | 9.3 | *** |
| Gentry Road/Eddins Road (North) | Unsignalized | A | 8.6 | *** | A | 8.4 | *** |
| Gentry Road/Eddins Road (South) | Unsignalized | A | 9.4 | *** | A | 9.5 | *** |
| Forrester Road/SH-78 | 4-Way Stop | A | 9.6 | 0.209 | B | 10.1 | 0.264 |
| SH-111/Sinclair Road | Unsignalized | B | 10.2 | *** | B | 10.8 | *** |

1 Unsignalized intersection LOS calculated using 2000 Highway Capacity Manual (HCM) Unsignalized Intersection methodology; 4-Way Stop

intersection LOS calculated using 2000 HCM 4-Way Stop Intersection methodology.

*** No volume-to-capacity (V/C) ratio is calculated under 2000 HCM Unsignalized Intersection methodology.

The portions of McKendry and Boyle Roads within the vicinity of the site, which are part of construction and operation truck and employee routes, are gravel roads.

IMPACTS

The discussion below analyzes potential traffic and transportation impacts, and proposed mitigation measures, at the project site and along the routes of related proposed linear facilities.

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project may have a significant effect on traffic and transportation if the project will:

- cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);
- exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- result in inadequate emergency access;
- result in inadequate parking capacity; or
- conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

CONSTRUCTION PHASE

Commute and Truck Traffic

Trips generated as a result of the project will consist of construction worker travel, truck delivery and waste hauling activity. The applicant has estimated that construction of the power plant facility will occur over a 20-month period (CE Obsidian 2002a p. 5.10-8) and will require an average construction workforce of 265 workers per month (CE Obsidian 2002a Table 3.4-1), assuming a single shift and a 40-hour workweek (CE Obsidian 2002a p.3-35). At the peak of the construction workforce for the plant and transmission lines, which would be month #14 of construction, an estimated 467 construction workers will be required with a daily trip total of 934 (CE Obsidian 2002a Table 3.4-1). Construction month #7 would be the high point of the combination of daily construction truck and worker trips at 946 without carpooling required (CE Obsidian 2002a Tables 3.4-1 & 2).

The preferred commuting route for construction workers would be primarily from SH-111 west on Sinclair Road, south on Gentry road, west on McKendry Road and south on Boyle Road to the site; and secondarily from SH-78/86 east on Bannister Road, north on Forrester and Gentry Roads, west on McKendry Road, and south on Boyle Road to the site. Most construction trucks would follow the route from SH -111 to Sinclair Road (CE Obsidian 2002a p. 5.10-8). During the peak month for construction activity there would be 539 truck deliveries (CE Obsidian 2002a Table 3.4-3). Construction equipment and material deliveries typically would be made between 7:00 a.m. and 5:00 p.m. Monday through Friday (CE Obsidian 2002a p. 5.10-7).

Traffic and Transportation Tables 4 and 5 show the project construction-related traffic on portions of highways and local roads, and the expected effect on local road

intersection level of service (CE Obsidian 2002c Tables 5.10-7R1 and 5.10-8R1). These tables demonstrate that projected LOS levels would in most cases be at LOS A or B, and would not fall below LOS C for any of these points of study, thus meeting the County's minimum traffic service standard of LOS C. Off-road construction worker parking would be provided (CE Obsidian 2002a p. 5.10-6).

Table 4
Distribution of Plant Construction-related Traffic on Highways
Projected Additional Vehicle Trips Per Day

| Highway/Roadway | Existing AADT | Existing LOS | Construction & Employee Traffic | Delivery and Haul Traffic | Added Vehicle Increase | Projected Vehicle Trips per Day | Projected LOS |
|--|---------------|--------------|---------------------------------|---------------------------|------------------------|---------------------------------|---------------|
| SH-78/86, B Street to Center Street (Forrester Road) | 8,100 | A | 76 | 0 | <1% | 8,716 | A |
| SH-78/86, Center Street (Forrester road) to H Street | 13,000 | A | 16 | 0 | <1% | 13,016 | B |
| SH-111/Sinclair Road to SH-115 (East) | 7,000 | A | 246 | 10 | 4% | 7,256 | A |

AADT = Average Annual Daily Traffic

LOS = Level of Service

1. Includes traffic associated with deliveries to the site and waste hauling from the site. Assume SH 111 to Sinclair Road is the preferred route for all delivery/haul traffic. See CE Obsidian 2002c Table 5.10-11R1 and 5.10-12R1, pp. 81-82.

Table 5 Distribution of Plant Construction-related Traffic on Local Roads
Projected Additional Vehicle Trips Per Day

| Highway/Roadway | Existing AADT | Existing Los | Construction & Employee Traffic | Delivery and Haul Traffic ⁽¹⁾ | Added Vehicle Increase (%) | Projected vehicle Trips per Day | Projected LOS ⁽³⁾ |
|--------------------------------|---------------|------------------|---------------------------------|--|----------------------------|---------------------------------|------------------------------|
| Sinclair Road ⁽¹⁾ | 1,160 | A | 478 | 10 | 42% | 1648 | A |
| McKendry Road ⁽²⁾ | 53 | A ⁽⁴⁾ | 930 | 10 | 1774% | 993 | A |
| Lindsey Road ⁽²⁾⁽⁵⁾ | 823 | A ⁽⁴⁾ | 81 | 0 | 10% | 904 | A |
| Eddins Road ⁽¹⁾ | 1,354 | A | 360 | 0 | 27% | 1714 | A |
| Severe Road ⁽²⁾ | 52 | A ⁽⁴⁾ | 10 (est.) | 0 | 21% | 62 | A |
| Boyle Road ⁽⁶⁾ | 100 (est.) | A ⁽⁴⁾ | 930 | 10 | 940% | 1040 | A |
| Gentry Road ⁽¹⁾ | 1,350 | A | 452 | 0 | 34% | 1802 | A |

AADT = Average Annual Daily Traffic

LOS = Level of Service

1 From Imperial County Traffic Count Database

2 New Counts taken on January 2002

3 LOS from Imperial County Standard Street Classification (Table 4 Circulation/Open Space Element)

4 According to the Circulation/Open Space Element (Table 4), Level of Service are not applied to residential streets because their primary purpose is to serve abutting lots, not to carry through traffic. Level of service normally applies to roads carrying through traffic.

5 Segment not a significant access route to project site.

6 Estimated counts approximately double Severe Roads counts, taken on January 2002.

7 Includes traffic associated with deliveries to the site and waste hauling from the site. Construction related haul uses SH-111 to Sinclair Road route. See Table 5.10-11R1 and 5.10-12R1.

Because Boyle Road is a local two-lane road, there could be peak hour traffic crossing-related delays and conflicts at or near the entrance of the private access road that would connect the laydown area to Boyle Road. The construction traffic control and implementation plan that would be required by **TRANS-5** would need to demonstrate resolution of any such problems.

Transport of Hazardous Materials and Waste

Some construction truck deliveries would include hazardous materials, but there would be no use of acutely hazardous materials during construction (CE Obsidian 2002a p. 5.10-7). The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. These potential impacts can be mitigated to insignificance by compliance with federal and State standards established to regulate the transportation of hazardous substances. No sensitive land uses (such as schools and childcare centers) are located near the project site. There is one sensitive land use along the above-described truck route: Grace Smith Elementary School at 9 East 4th Street, Niland, near the corner of East 4th Street and SH-111. Because SH-111 north of Sinclair Road is not expected to be a major route for project transport of construction materials and waste, It is not expected that the additional truck traffic caused by project construction would create an impact on this school site. There has been no history of problems caused by truck traffic at the one school bus stop on SH-111, 3/4 mile south of Niland (Spellins). Furthermore, the school bus stop is recessed from the highway. There are no school bus routes in the vicinity of the project site (Raceles).

The California Department of Motor Vehicles specifically licenses all drivers who carry hazardous materials. Drivers are required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous waste spills. Drivers transporting hazardous waste are required to carry a manifest, which is available for review by the California Highway Patrol at inspection stations along major highways.

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) are equally important in ensuring that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol.

The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. The handling and disposal of hazardous substances is also addressed in the Waste Management, Worker Safety and Fire Protection, and Hazardous Materials sections of this report. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with federal and State standards established to regulate the transportation of hazardous substances. Proposed Condition **TRANS-3** would ensure compliance with these requirements for transportation of hazardous materials. Additional requirements are discussed in the sections mentioned above.

Oversize and Overweight Loads

Transportation of equipment that would exceed the load size and limits of certain roadways would require special permits from the County and Caltrans. Staff has proposed Condition **TRANS-1** to ensure compliance with this requirement.

Emergency Access

The nearest emergency response facility is the Calipatria Fire Department, approximately 11 miles from the project site. Emergency medical services would be provided by Pioneers Memorial Hospital in Brawley, approximately 22 miles from the project site. Ambulance service can be provided by the Calipatria Fire Department, and Gold Cross Ambulance Company from El Centro and Brawley. It is estimated that the average response time for an ambulance would be one hour (CE Obsidian 2002a p. 5.9-5). Staff has requested the applicant to provide information on project site fire and medical emergency access routes, the closest designated emergency evacuation routes, and the most direct route to the above hospital from the project site. The applicant has not yet responded. Proposed Condition **TRANS-5** would require preparation of a Construction Traffic Control and Implementation Plan that addresses emergency access.

Well Pads

Five well pads with two wells for each pad, for a total of 10 production wells, and seven injection wells on three new injection well pads would be constructed. Traffic impacts caused by the construction of these wells would be insignificant due to the short distance of the wells to the SSU6 site.

Linear Facilities

Transmission Lines

The project's proposed L-Line Interconnection would run south from SSU6 for 16 miles to the Imperial Irrigation District's (IID) existing "L" line. This line would be constructed for 14 miles along Lack Road and Bannister Road. The IID Midway Interconnection would be constructed from SSU6 for 15 miles east generally along Hooper road to the existing Midway Substation. The applicant has identified an alternative L-Line Interconnection route which would replace the last 2.8 miles of this route through Bureau of Land Management (BLM) lands with a route north along SH-86 for approximately 7.5 miles to the intersection of SH-86 and the L-Line. This alternative would allow the Applicant to avoid using the BLM land for transmission line construction (CE Obsidian 2002a pp. 6.6-6.7).

Both transmission line routes would cross many roads (CE Obsidian 2002a p. 5.10-5). Temporary staging areas would be used when a transmission line construction area is distant from the project site (CE Obsidian 2002a p. 5.10-11). The locations of these staging areas have yet to be determined. These temporary staging areas, to be located on private property, would also be used for construction worker parking. Traffic impacts during construction along access routes could be caused by use of heavy equipment, trucks, and workers' vehicles. The construction traffic control and implementation plan required by **TRANS-5** would need to mitigate the effect of these impacts to the extent necessary.

Production and Injection Pipelines

Geothermal steam production pipelines would be constructed to connect the well pads to the project. These pipelines would cross six roads near the project site. Injection

pipelines would be constructed from the project to the injection wells, crossing five roads. Construction of the production and injection pipelines across roads would cause short term interruption of traffic (CE Obsidian 2002a p. 5.10-13). The construction traffic control and implementation plan required by **TRANS-5** would need to mitigate the impact of these interruptions to the extent necessary and practical.

Parking and Laydown Areas

Temporary construction worker parking at the main project site would be located south of the project site adjacent to Boyle Road. The approximately 5.5 acre parking space would be adequate at the peak of construction with carpooling. If the worst case scenario of having to provide parking for 467 workers' vehicles (without carpooling) were to occur, staff believes that the applicant-owned site is large enough to allow for expansion of the lot if necessary. The construction laydown area would be located on the south side of the proposed power plant site.

OPERATIONAL PHASE

Commute Traffic

Operation of the power plant is expected to require a labor work force of approximately 69 full-time employees. Assuming a worst case scenario in which each employee would be on site at the same time, drive separately to work, and make one round trip from home to work per day, operation of the project would generate approximately 138 employee vehicle trips per day (CE Obsidian 2002a p. 5.10-10). Employee carpools and ridesharing could reduce employee-related trips. Employee parking would be available on a paved lot adjacent to the project site (CE Obsidian 2002a p. 5.10-10). Based on the relatively low number of full-time employees at SSU6 and current uncongested traffic conditions, it is anticipated that the traffic generated would be easily accommodated by the existing roadway system.

Truck Traffic

Deliveries to the project site are expected for on-going maintenance of the plant. There would be a minimum of 32 delivery and non-hazardous waste (e.g., oily rags, brine solids, and sulfur byproducts) hauling trips daily during the operations period, with more trips made on irregular schedules reaching as many as 54 trips per day (CE Obsidian 2002c Table 5.10-12R1). The operational period truck route is expected to be the same as for the construction period described above.

LOS Impact

The resulting LOS on highways would result in the change of one highway section from LOS A to LOS B, above the County's minimum standard of LOS C (CE Obsidian 2002c Table 5.10-7aR1). For the local roads involved, the resulting LOS would remain unchanged from the existing LOS A on all roads. These projections are based on the estimation of SSU6 traffic impact on average daily traffic, not on peak hour traffic. Given the high number of truck trips during operations (i.e., at least 32 daily) due to delivery and waste hauling, there could be peak hour impacts on local roads and intersections. Condition **TRANS-8** would require that project operation period truck trips be planned to avoid peak traffic periods.

With the proposed conditions, the power plant would not generate substantial vehicular movement; would not alter present traffic circulation patterns; would not alter waterborne, rail, or air traffic; would not substantially increase traffic hazards to motor vehicles, bicyclists, or pedestrians; would not violate adopted LOS standards; and would not create demand for new parking that cannot be accommodated by the project design. As such, operation of the proposed power plant is not expected to result in significant long-term impacts to the local transportation system. Transport of Hazardous Materials and Waste

There would be at least 39 hazardous materials and waste truck trips weekly during project operation (CE Obsidian 2002c Table 5.10-12R1). Adoption of **TRANS-3** would ensure that necessary permits and licenses are secured for the transport of hazardous materials. There is one sensitive land use along the above-described truck route: Grace Smith Elementary School at 9 East 4th Street, Niland, near the corner of East 4th Street and SH-111. It is not expected that the additional truck traffic caused by project construction would create an impact on this school site. There are no school bus routes in the vicinity of the project site (Raceles).

Federal Aviation Administration (FAA) and the Imperial County Airport Land Use Commission

Because of the distance of the project site from the nearest airport and the height of project facilities, the FAA does not need to review this project. There are no airports in the vicinity of the project site, and the project would not be within the safety zones of any airport. Therefore the ALUC will not review the total project but has reviewed the construction of the 125-foot high IID transmission line and poles that would extend 16 miles south and westward from the project site to the existing 161 kV “L”-line and 15 miles eastward to the Midway Substation. The ALUC has found the proposed new transmission line and poles to be consistent with the Airport Land Use Compatibility Plan with the condition that warning devices in the form of high-density, orange balls be attached to the transmission lines adjacent to a private airstrip and under the low-level military route (Heuberger). Staff is researching the location of this airstrip and the portion of the military route affected by the transmission lines. Condition **TRANS-7** would require the applicant to meet the requirements of the ALUC.

CUMULATIVE IMPACTS

The AFC contains the results of a survey of State and local government agencies for potential projects that could have a cumulative impact. There are three planned projects within 12 miles of the SSU6 site (CE Obsidian 2002a p. 5.10-13, 5.17-1 through 5). These projects are:

- Caltrans Improvement of State Route 78/111 Expressway (Brawley Bypass) (Project ID1)
- Solar Evaporation Pond Pilot Project (Project ID2) (12 to 15 miles north of the SSU6 site)

- IID water conservation and Transfer Project/Habitat Conservation Plan (Project ID3)
This project involves conservation activities within IID's water service area in Imperial County.

Construction impacts from these projects would be temporary and local, and would not cause significant cumulative impacts. Because of their distance from SSU6 they would not conflict with SSU6 construction, nor would SSU6 construction conflict with these projects. SSU6 would also not add to growth-inducing impacts in the area because the project would add only 69 operational employees.

FACILITY CLOSURE

There are at least three circumstances in which a facility closure can take place; planned closure, unexpected temporary closure and unexpected permanent closure. The minimum design life of the power plant is expected to be 30 years. At least 12 months prior to the proposed decommissioning, the applicant shall prepare a closure plan for submission to the Energy Commission for review and action. At the time of closure all then-applicable LORS will be identified and the closure plan will address how to comply with these LORS. The effects of closure for the SSU6 Energy power plant on traffic and transportation will be similar to those discussed for the construction of the project. Closure will create traffic levels that are similar in intensity and duration to those expected during facility construction.

Unexpected temporary closure occurs when the facility is closed suddenly or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster, or an emergency. From the perspective of traffic and transportation issues, in the event of temporary facility closure, the applicant would have to comply with all applicable policies contained in the LORS section of this report regarding transportation permits for hazardous materials and equipment.

Unexpected permanent closure occurs if the project owner closes the facility suddenly or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. Staff assumes that the facility will either remain idle until such time that new ownership is established, or dismantling of the facility will occur. In any event, the owner will have to secure applicable transportation permits to satisfy the LORS requirements as stated in this report.

In the event of temporary closure, the effects on traffic and transportation would be similar to those for normal operation of the power plant facility. In the event of permanent closure, the effects would be similar to those associated with project construction. Permanent closure will involve a peak work period with commuter traffic. In either instance, the roadway systems within the vicinity of the project should be able to handle traffic without significantly affecting the current level of service of the area.

MITIGATION

Staff proposes conditions of certification **TRANS-1, TRANS-2, TRANS-3, TRANS-7, and TRANS-8** to ensure compliance with applicable LORS requirements.

The County would require that the gravel roads in the project vicinity be paved by the applicant (Jorgenson). The County road improvement requirements would be met by implementation of County encroachment permit specifications, which would be part of the County building permit (Cabanilla 2002). Any work performed on County roads requires an encroachment permit. The encroachment permit would also include the private access road into the construction laydown/parking site (Cabanilla 2003).

The County General Plan's relevant goals, implementation programs, and policies would be supported by this project with the implementation of the conditions of certification.

Staff has also proposed additional conditions to require the applicant to implement the following traffic and transportation mitigation measures:

- Enforce a policy that all project-related parking occurs in designated, off-street parking areas (**TRANS-4**).
- Prepare a construction traffic control and implementation program subject to review by the Imperial County Public Works Department, and Caltrans. (**TRANS-5**). The construction traffic control and implementation plan shall include measures to maximize construction worker carpooling and any other necessary measures to mitigate direct and cumulative impacts associated with construction activities occurring within any public street right-of-way in accordance with local jurisdictional requirements.
- Repair any damage to adjacent roadway sections incurred during construction to the road's pre-project construction condition. (**TRANS-6**).
- During the operating period the applicant would be required to schedule for delivery of supplies and waste transport to avoid truck trips during peak hour traffic (**TRANS-9**).

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed SSU6 Energy Project (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than 50 percent within the same radius. Based on the **Traffic and Transportation** analysis, staff has identified several potential direct impacts resulting from the construction or operation of the project. We believe that these potential impacts can be mitigated to a level of insignificance and we are recommending adoption of mitigation measures. Given the recommended mitigation of the potential traffic impacts, staff has concluded that there are no **Traffic and Transportation** environmental justice issues related to this project.

CONCLUSIONS

Staff has concluded that the proposed project has the potential to cause an impact in the traffic and transportation area. These potential impacts include the following concerns:

- Possible peak hour traffic impacts during construction and operational phases;
- Hazardous materials and waste transport;
- Oversize/overweight loads;
- Emergency access to the project site;
- Interruption of traffic during construction of linear facilities;
- Operation period peak hour congestion of local roads and intersections;
- Safety concerns regarding the proximity of the new transmission lines to a private airstrip and the low-level military route.

It appears that all identified project impacts can be mitigated to a level of insignificance through the implementation of staff's proposed mitigation measures. However, staff cannot make final conclusions until receipt of responses to outstanding requests for information from the applicant. These requests for information include: emergency access routes, impact of operation period truck traffic on local roads and intersections, possible conflict between SSU6 construction and Caltrans construction sites, clarification of AFC table information; the location of the private airstrip and portion of the low-level military route that could be impacted by the new transmission lines, and the name of the project sponsor of the Solar Evaporation Pond Pilot Project noted as a source of potential cumulative impact.

If the project is approved, staff recommends that the Energy Commission adopt the following Conditions of Certification.

TRANS-1 The project owner shall comply with the California Department of Transportation (Caltrans) and any affected local jurisdiction's limitation on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain the required transportation permits from Caltrans and any affected local jurisdiction for use of the public right-of-way (roadway).

Verification: In the Monthly Compliance Reports, the project owner shall submit copies of any permits received during that month's reporting period to the Energy Commission's Compliance Project Manager (CPM). In addition, the project owner shall keep copies of these permits and supporting documentation in its compliance file for a minimum of six months after the start of commercial operation.

TRANS-2 Prior to any ground disturbance within the public right-of-way (e.g. highway, road, bicycle path, walkway, etc.), the project owner or its contractor shall comply with the applicable requirements of Caltrans and any affected local jurisdiction for encroachment into the public right-of-way (i.e. encroachment permit).

Verification: The CPM, a Caltrans representative or the affected local jurisdiction's representative may conduct random site visits to verify compliance. The CPM may temporarily stop construction to review a compliance matter regarding an encroachment permit.

In Monthly Compliance Reports, the project owner shall submit copies of the Caltrans and affected local jurisdiction issued/approved encroachment permits received during the reporting period. In addition, the project owner shall retain copies of the issued/approved permits and supporting documentation in its compliance file for a minimum of six months after the start of commercial operation.

TRANS-3 The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.

Verification: The project owner shall include in its Monthly Compliance Reports, copies of all permits/licenses received during the reporting period that were obtained by the project owner and/or subcontractors concerning the transport of hazardous substances.

TRANS-4 The project owner shall conform to the applicable parking standards of Imperial County. The project owner shall prepare a parking plan for the pre-construction, construction and operation phases of the project in consultation with Imperial County. Imperial County shall have 30 calendar days to review the parking plan and provide written comments to the project owner. The project owner shall provide a copy of Imperial County's written comments and a copy of the parking plan(s) to the CPM.

The parking plan shall include a policy to be enforced by the project owner that all project-related parking occurs on-site or in designated off-site parking areas as identified or shown in the plan.

Verification: The parking plan(s) shall show the location of the proposed parking area(s), a plot plan with dimensions with an accurate portrayal of the number of parking spaces in accordance to the sizes stipulated in the applicable parking standards by Imperial County.. The plan shall also show the parking lot circulation, car/van pool loading and unloading area(s) and any other item(s) that are requested by Imperial county subject to approval by the CPM.

The project owner shall submit the proposed parking plan to Imperial County for review and comment. Imperial County shall have 30 calendar days from the date of the project owner's submittal to provide written comments to the CPM to review for approval.

At least 30 calendar days prior to site mobilization, the project owner shall provide a copy of the finalized parking plan to the CPM for approval.

TRANS-5 The project owner shall prepare a construction traffic control and implementation plan for the project and its associated facilities. The project owner shall consult with the affected local jurisdiction(s), regional transportation authority and Caltrans (if applicable) in the preparation of the traffic control and implementation plan. The local jurisdiction and Caltrans (if applicable) shall have

30 calendar days to review the plan and provide written comments to the project owner. The project owner shall provide a copy of the local jurisdiction's and Caltrans' written comments and a copy of the traffic control and implementation plan to the CPM.

Verification: The traffic control and implementation plan shall include and describe the following minimum requirements:

- Timing of heavy equipment and building materials deliveries;
- Redirecting construction traffic with a flagperson;
- Signing, lighting, and traffic control device placement if required;
- Construction work hours and arrival/departure times outside of peak traffic periods;
- Haul routes;
- Procedures for safe access to the main entrance;
- Ensure access for emergency vehicles to the project site;
- Temporary travel lane closure;
- Ensure access to adjacent residential and commercial property during the construction of all linears; and
- Options and incentives for construction workforce ridesharing.

The project owner shall submit the proposed traffic control and implementation plan to the affected local jurisdiction and Caltrans for review and comment. The project owner shall provide any comment letters to the CPM for review and approval.

At least 30 calendar days prior to site mobilization, the project owner shall provide a copy of the traffic control and implementation plan to the CPM for review and approval.

TRANS-6 The project owner shall repair any affected public right-of-way (e.g. highway, road, bicycle path, walkway, etc.) that has been damaged or deteriorated due to pre-construction and construction activities conducted for the project to its condition prior to the start of pre-construction activities.

Verification: Prior to the start of site mobilization, the project owner shall photograph, videotape or digitally record images of any public right-of-way potentially affected by the project. The project owner shall provide the CPM, the affected local jurisdiction(s) and Caltrans (if applicable) with a copy of these images.

Prior to start of site mobilization, the project owner shall notify the affected local jurisdiction(s) and Caltrans (if applicable) about its schedule for project construction. The purpose of this notification is to allow postponement any local jurisdiction or Caltrans-planned public right-of-way repair or improvement project until after power plant project construction has taken place and to coordinate construction related activities associated with the applicable identified Caltrans or local jurisdiction project(s) with the project owner.

At least 60 calendar days prior to the issuance of a final inspection by the CPM, the project owner shall meet with the CPM, the affected local jurisdiction(s) and Caltrans (if

applicable) to identify sections of public right-of-way to be repaired, to establish a schedule to complete the repairs and to receive approval for the action(s). Following completion of any public right-of-way repairs, the project owner shall provide to the CPM a letter signed by the affected local jurisdiction(s) and Caltrans (if applicable) stating their satisfaction with the repairs.

TRANS-7 The project owner shall provide appropriate evidence of compliance with the airport land use commission's regulations and conditions (e.g., Airport Comprehensive Land Use Plan, etc.) for the project and any associated facilities located within an airport planning boundary of a public use airport or military air facility.

Verification: The project owner shall submit to the ALUC information as required by the demonstrating compliance with the ALUC's recommended condition.

At least 30 calendar days prior to start of commercial operation, the project owner shall provide a copy of the ALUC's signed written determination prepared for the project to the CPM for review and approval.

TRANS-8 During the project operating period the project owner shall require by contract that delivery and waste removal contractors avoid truck transport during peak traffic periods.

Verification: Within 60 days after start of operations the project owner shall submit to the CPM for approval all contracts with delivery and waste removal contractors.

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TRANSMISSION LINE SAFETY AND NUISANCE

Obed Odoemelam, Ph.D.

INTRODUCTION

The energy from the proposed Salton Sea Unit 6 Project (SSU6) would be delivered to the Imperial Irrigation District (IID) power grid by electrically connecting the facility with the existing IID transmission line (L-Line) to the southwest, and to the 230 kV Midway Substation to the East. According information from the applicant, CE Obsidian Energy, LLC (CEOE), the connection to the L-Line would be a double-circuit 161 kV overhead line 16 miles long, while the connection to the Midway Substation would be a 15-mile single-circuit 161 kV line. Both lines would have a 230 kV capacity and be built, owned, operated, and maintained by IID (CEOE 2002a, pages 1-1, 3-31, 3-46, and 5.8-4).

The purpose of this staff analysis is to assess the proposed transmission line design and operational plan for compliance with the applicable health and safety related laws, ordinances, regulations, and standards (LORS). If such compliance is established, staff would not recommend further mitigation measures with respect to the field and non-field issues of concern in this analysis; if not, staff would recommend revisions to the interconnection plan as appropriate. Staff's analysis focuses on the following issues:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Discussed below by subject area are design-related LORS applicable to the physical impacts of the overhead transmission lines as proposed to be used to transmit the energy from SSU6. The potential for these impacts would depend on the applicant's compliance with these LORS, which are specific federal or state regulations or established industry standards and practices. There presently are no local laws or regulations specifically aimed at those aspects of the structure or dimensions of electric power lines that influence the magnitude of the impacts noted above. The only such regulations are local requirements for such lines to be located underground in new housing developments because of the potential for visual impacts on the landscape. Such requirements are not aimed against any specific health effects.

AVIATION SAFETY

Any hazard to area aircraft would relate to the potential for collision in the navigable air space. The applicable federal LORS discussed below are intended to ensure the distance and visibility necessary to prevent such collisions.

Federal

- Title 14, Code of Federal Regulations (CFR), Part 77, “Objects Affecting the Navigation Space”. Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a “Notice of Proposed Construction or Alteration” is required for potential obstruction hazards. The need for such a notice depends on factors related to the height of a structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved. Such notification allows the FAA to ensure that all structures are located to avoid the aviation hazards of concern.
- FAA Advisory Circular (AC) No. 70/460-2H, “Proposed Construction and or Alteration of Objects that May Affect the Navigation Space.” This circular informs each proponent of a project that could pose an aviation hazard of the need to file the “Notice of Proposed Construction or Alteration” (Form 7640) with the FAA.
- FAA AC No. 70/460-1G, “Obstruction Marking and Lighting.” This circular describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Transmission line-related radio-frequency interference is one of the indirect effects of line operation produced by the physical interactions of line electric fields. Since electric fields are unable to penetrate most materials, including the ground, such interference and other electric field effects are not associated with underground lines. The level of any such interference usually depends on the magnitude of the electric fields involved. Because of this, the potential for such impacts can be assessed from field strength estimates obtained for the line. The interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge, but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio-frequency communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration, and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The following regulations are intended to ensure that such lines are located away from areas of potential interference and that any interference is mitigated whenever it occurs.

Federal

- Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing force fields, which interfere with radio communications, even if (as with transmission

lines) such devices are not intentionally designed to produce radio-frequency energy. For such lines, such interference is minimized from the use of specific low-corona cables as conductors. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis.

State

- General Order 52 (GO-52), California Public Utilities Commission (CPUC). Provisions of this order govern the construction and operation of power and communications lines and specifically deal with measures to prevent or mitigate inductive interference. Such interference is produced in the case of power lines by the electric field directly induced by the energized conductor in the antenna of a radio signal receiver.

Several design and maintenance options are available for minimizing these induced fields. When incorporated into the line design and operation, such measures also serve to reduce the line-related audible noise discussed below.

AUDIBLE NOISE

Industry Standards

There are no design-specific federal regulations that limit the audible noise from transmission lines. As with radio noise, such noise is limited instead through design, construction, or maintenance practices established from industry research and experience. These practices are effective and do not significantly impact line safety, efficiency, maintainability, and reliability. All modern overhead high-voltage lines are designed to assure compliance. As with radio-frequency noise, such noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying or hissing sound, or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-foot right-of-way. Underground lines do not generate such noise since they cannot produce the responsible surface-level electric fields.

NUISANCE SHOCKS

Industry Standards

There are no design-specific federal regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are

induced in different ways by the line electric and magnetic fields. As with the proposed overhead lines, the applicant is responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

FIRE HAZARDS

The fire hazards addressed through the following regulations are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

State

- General Order 95 (GO-95), CPUC. “Rules for Overhead Electric Line Construction” specify tree-trimming criteria to minimize the potential for power line-related fires.
- Title 14 California Code of Regulations Section 1250. “Fire Prevention Standards for Electric Utilities” specify utility-related measures for fire prevention.

HAZARDOUS SHOCKS

The hazardous shocks addressed through the following regulations and standards are those that could result from direct or indirect contact between an individual and the energized line whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

State

- GO-95, CPUC. “Rules for Overhead Line Construction” specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance, and inspection. Implementing these requirements ensures the safety of the general public and line workers.
- Title 8, California Code of Regulations (CCR), Sections 2700 through 2974. “High Voltage Electric Safety Orders” establish essential requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment

Industrial Standards

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements in the National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. These provisions specify the minimum national safe operating clearances applicable in areas where the line might be accessible to the public. They are intended to minimize the potential for direct or indirect contact with the energized line.

ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE

The possibility of deleterious health effects from electric and magnetic field exposure has increased public concern in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by

CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. However, staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate, in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant patterns (e.g., high-level, short-term versus low-level, long-term) of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State

In California, the CPUC (which regulates the installation and operation of high-voltage lines in California) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields below levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each electric utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. The other utilities that are not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements by designing their lines in keeping with the guidelines of the major area utility. The service utility in this case is IID. This field reduction policy of the CPUC resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires each applicant to show how each proposed overhead line would be designed to comply with the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local issues bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied to an extent that does not significantly affect line operation and safety. The extent of such applications would be reflected by the ground-level field strengths as measured during operation. When estimated, or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess each line design for effectiveness at field strength reduction. These

field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new line in California is currently required to be designed according to the EMF-reducing guidelines of the utility in the service area involved, its fields are required under existing CPUC policies to be similar to fields from similar lines in that service area. Designing the proposed project lines according to existing IID field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management. Staff recommends a specific condition of certification (**TLSN-1**) to ensure implementation of the design measures necessary.

Industrial Standards

There are no health-based federal regulations or industry codes specifying limits on the strengths of fields from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF health issue.

In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (such as Florida, Minnesota, New Jersey, New York, and Montana) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time and that the present knowledge of the issue does not justify any retrofit of existing lines.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component whose effects can manifest themselves as the previously noted radio noise, audible noise, and nuisance shocks. The present focus is on the magnetic field because only it can penetrate the soil, building, and other materials to potentially produce the types of health impacts at the root of the present concern. As one focuses on the strong magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important for perspective, to note that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances such as hair dryers, electric shavers, and electric tooth brushes (National Institute of Environmental Health Services and the U.S Department of Energy, 1995). Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

SETTING

According to information from the applicant, (CEOE 2002, pages 1-2, 1-3, 3-6, 3-7, 5.1-1, 5, 5.8-2, and 5.8-3), the proposed SSU6 would be located on an 80-acre portion of a 160-acre land parcel approximately 1,000 feet southeast of the Salton Sea in the unincorporated area of Imperial County California. The related switchyard would be located about 12.5 miles away along L-line interconnection on Banister Street (CEOE 2003b). The actual project site is in the northern half of the block bounded by McKendry Road to the north, Severe Road to the west, Peterson Road to the South, and Boyle Road to the east. The town of Niland is approximately 7.5 miles to the northeast, with the town of Calipatria approximately 6.1 miles to the southeast. The site is in a region of mostly open spaces, agricultural lands, and geothermal energy production, with nine geothermal power plants located within a 2-mile-radius.

There are relatively a few residences along the routes of the proposed lines, the nearest ones being between 150 feet and 0.5 miles. This relative lack of nearby residences means that the residential field exposure of the present concern would be insignificant for these project lines. The only project-related EMF exposures of potential significance are the short-term exposures to plant workers, regulatory inspectors, maintenance personnel, approved guests, or individuals in transit across the project's lines. These types of exposures are short term and well understood as not significantly related to the present health concern.

PROJECT DESCRIPTION

The proposed project lines and related facilities would consist of the following major segments:

- A new 161 kV Switchyard 12.5 miles away on Banister Street;
- A double-circuit, 16-mile long, overhead 161 kV (230 kV-capacity) transmission line running between SSU6, the new Banister Road Switchyard, and IID's L-Line to the southwest,
- A single-circuit 15-mile long, overhead 161 kV (230 kV-capacity) transmission line running between the SSU6 and the existing IID Midway Substation to the West; and
- Project-related modifications within the Midway Substation.

Both lines would be supported on steel poles of between 100 ft and 125 ft in height to ensure a minimum conductor height of 35 feet in keeping with GO-95 requirements. The lines would be placed approximately 1000 feet apart and located within a 150-ft right-of-way. These utilized rights-of-way would be within existing IID line corridors, or corridors of roadways. Locating these lines within these existing corridors would be in keeping with present state policy on location of new lines. The applicant has provided the basic structures of these support poles relative to safety and field strength reduction efficiency. Details of the intended routes have been provided for both lines as they exist from the project switchyard towards their respective termination points at the L-Line and the IID Midway Substation (CEOE 2002a, pages 3-32 through 3-34).

IMPACTS

GENERAL IMPACTS

GO-95, and Title 8, California Code of Regulations, section 2700 et seq., as noted in the LORS section, ensure the minimum regulatory requirements necessary to prevent the direct or indirect contact previously discussed in connection with hazardous shocks or aviation hazards. Of secondary concern are the noted field impacts manifesting themselves as nuisance shocks, radio noise, communications interference, and magnetic field exposure. The relative magnitude of such impacts would be reflected in the field strengths characteristic of a given line design. Since applied field-reducing measures can affect line operations and safety, the extent of their implementation and resulting field strengths would vary according to environmental and other local conditions bearing on line safety, efficiency, reliability, and maintainability. IID established its own design guidelines as best applicable to its utility service area. Given the present CPUC requirement to maintain the noted impacts within the levels associated with existing lines, compliance with applicable LORS would be achieved by showing the project-specific fields to be within the range associated with IID lines of the same voltage and current-carrying capacity.

PROJECT SPECIFIC IMPACTS

Aviation Safety

As noted by the applicant, (CEOE 2002a, page 4-15), the closest airport to the proposed and related facilities is an airstrip 6 miles southwest in the city of Calipatria. This airstrip is used mostly for crop dusting operations and is too far from the project to pose a collision hazard to utilizing aircraft. The nearest commercial airport is the Imperial County Airport located approximately 20 miles southeast of the project, where it is too far for the project's lines to pose a collision hazard to utilizing aircraft, according to the previously noted FAA criteria. As is common industry practice, the applicant will inform the FAA about the proposed project lines although no FAA notice would be required.

Audible Noise and Interference with Radio-Frequency Communication

The previously noted corona-related communications interference is most commonly caused by irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware, and other discontinuities around the conductor surface. All existing IID lines were built and are currently maintained according to standard IID practices that minimize such surface irregularities and discontinuities (CEOE 2002a, page 3-46). Moreover, the potential for such corona-related audible noise and interference is usually of concern for lines of 345 kV and above and not the 161 kV lines of these types. The low-corona design to be used would be the same as used for other IID lines of the same voltage (CEOE 2001a, page 4-15) in compliance with the previously noted FCC (47 C.F.R. §15.25) and GO-52 prohibitions against interference with radio communication. Since (a) the edge of the right-of-way would mark the beginning of the areas of possible human habitation around a high-voltage line, and (b) there are no residences in the immediate vicinity of the proposed rights-of-way, staff does not expect the proposed line to generate any complaints about operational noise,

or interference with residential radio or television use. In the unlikely event of specific complaints, IID would be responsible (as with other IID lines) for the necessary mitigation as required by the FCC. Staff recommends a specific condition of certification (**TLSN-2**) in this regard. For an assessment of noise from all aspects of the project construction and operation, please see staff's analysis in the **Noise and Vibration** section.

Fire Hazards

Standard fire prevention and suppression measures for all IID lines would be implemented for the proposed project 161kV lines. The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this compliance approach (CEOE 2002a, page 4-15). IID's fire prevention practices for high-voltage lines would be implemented in compliance with Title 14, California Code of Regulations, section 1250. Staff recommends **TLSN-4** to ensure implementation.

Hazardous Shocks

Since the proposed 161 kV lines would be designed according to GO-95 requirements together with the requirements in specific sections of Title 8, California Code of Regulations, section 2700 et seq. against direct contact with the energized line, as is normal IID practice (CEOE 2002a, page 4-15), staff does not expect their use to pose a significant shock hazard.

Nuisance Shocks

The potential for nuisance shocks around the proposed project lines would be minimized through standard grounding practices implemented for similar IID lines (CEOE 2002a, page 4-15). Staff recommends **TLSN-5** to ensure implementation.

Electric and magnetic field exposure

The applicant estimated the maximum field strengths possible along the routes of the proposed project lines (CEOE 2002a, pages 4-16, 4-17, and Appendix L) to assess the effectiveness of the field reduction measures to be incorporated into the proposed line design. The calculations were made for five representative line configurations to be encountered along the rights-of-way (as more fully discussed in Appendix L). Staff is in agreement with the applicant's assumptions with respect to parameters bearing on field strength dispersion and exposure levels. The maximum electric field strength within the right-of-way of the double-circuit Project-to-L-line segment was estimated by the applicant as 2.3 kV/m, diminishing to approximately 0.1 kV/m at the edge of the lines' 150-ft right of way. The equivalent values for the single-circuit Project-to-Midway Substation segment are 1.51 kV/m within the right-of-way, diminishing to 0.1 kV/m at the edge of this 150 ft right-of-way. These field strength value are within the values staff would expect for IID lines of the same design and voltage rating. The 0.1-kV/m values at the rights-of-way could be compared with values of between 1.0 kV/m and 2.0 kV/m for the edges of rights-of-way in states with regulatory limits.

The maximum magnetic field within the right-of-way for the Project-to-L-line segment, by itself, was estimated as 56.5 mG, diminishing to 6.1 mG at the edge of the 150-ft right-of-way. The maximum value at the point of maximum addition to fields from nearby

lines (in this case, a nearby 92 kV single-circuit line, and a 34.5 kV single-circuit line). was calculated as 62.2 mG, diminishing to 5.8 mG at the edge of the 150-ft right-of-way. The values for the Project-to-Midway Substation segment were calculated as 92.4 mG, diminishing to 7.7 mG at the edge of the right-of-way. The maximum value at the point of maximum interaction with nearby fields (in this case a 161 kV double-circuit line) was calculated as 54.3, diminishing to 3.5 mG at the edge of the right-of-way. The lines' maximum field strengths of 98.2 mG and 56.5 mG are within the range staff would expect for similar IID lines. The 7.7 mG and 5.8 mG (edge of right-of-way) values are being much lower than the 150 mG to 250 mG specified by the few states with specific regulatory limits.

The calculated field strengths reflect the effectiveness of IID's standard field reduction measures as applied with respect to the following:

- Distance between the conductors and the ground;
- Spacing between conductors on the same line;
- Distance between conductors in nearby lines;
- Line current levels; and
- Current flow alignment for effective field cancellation.

Since these measures are usually applied to the extent IID considers to be without impacts on line safety, efficiency, reliability, and maintainability, staff considers further mitigation to be unnecessary, but recommends condition of certification (**TLSN-3**) to allow for validation of the reduction efficiency attributable to the design in question. The need for further mitigation would be assessed by comparing the measured field strengths with fields from IID lines of the same voltage and current-carrying capacity.

CUMULATIVE IMPACTS

Since the previously noted 62.2 mG and 54.3 mG were calculated respectively, for the proposed lines' points of maximum interaction with nearby lines, they should be seen as representing the maximum post-project exposures of a cumulative nature. As reflected in the calculated values, the lines' potential contribution to any area exposures would be similar to those associated with area IID lines of the same voltage and current-carrying capacity. It is this similarity in field intensity (which reflects the effect implementation of the applicable field strength-minimizing measures) that constitutes compliance with existing CPUC requirements. The field strength measurement requirements in **TLSN-3** would allow for assessment of the field strength reduction efficiency assumed by the applicant.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population as greater than 50 percent within a six-mile radius of the proposed SSU6 Project (please refer to **Socioeconomics Figure 1** in this staff assessment). Census 2000 information suggests the population of the low-income individuals in the area as presently less than 50 percent, meaning that there would be no issue of environmental injustice (on the bases of income) for the field impacts of concern in this analysis. The above noted

minority profile caused staff to conduct a screening level analysis for potential environmental injustice on the basis of minority status. Since, (a) staff found the field levels at issues to be at normal background levels at the estimated values of less than 1.0 kV/m, and (b) the proposed field reduction designs are standard IID designs that are applied throughout the IID service area without regard to minority status, staff regards the field exposure aspect of the environmental justice issue as insignificant for the proposed lines.

COMPLIANCE WITH LORS

The magnitude of the line impacts of concern in this analysis are within the limits associated with similar transmission lines designed and operated in compliance with IID's field strength reduction guidelines that reflect compliance with present CPUC requirements. Staff, therefore, considers the proposed project transmission line design and operational plan to be in compliance with the health, safety, and design LORS of concern in this analysis.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for overhead or underground lines, the public health significance of any SSU6-related field exposures cannot be characterized with certainty. The long-term, mostly residential magnetic exposure at the root of the present health concern would be insignificant during operations, given the general absence of residences in the lines' field impact areas. On-site worker or public exposures would be short-term and at levels associated with IID lines of similar designs and current-carrying capacity. Such exposures are well understood and have not been established as posing a health hazard to humans.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures applied to all IID lines. The proposed line support structures are neither tall enough nor close enough to area airports to pose a significant collision hazard. The use of low-corona line design together with appropriate corona-minimizing construction practices would minimize the potential for corona noise and its related interference with radio-frequency communication anywhere in the project area.

RECOMMENDATIONS

Since the proposed 161 kV project lines would be designed and operated to minimize the safety and nuisance impacts of specific concern to staff (while also located away from area residences), staff does not recommend any changes to the proposed power transmission plan. If the proposed power plant is approved, staff would recommend adoption of the conditions of certification specified below to ensure implementation of the measures necessary for the field reduction and safety assumed by the applicant.

CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall ensure that the proposed 161 kV lines are designed and constructed according to the requirements of CPUC's GO-95, GO-52, the applicable sections of Title 8, California Code of Regulations section 2700 et seq., and IID's EMF reduction guidelines arising from CPUC Decision 93-11-013.

Verification: Thirty days before starting construction of the SSU6 transmission lines or related structures and facilities, the project owner shall submit to the Energy Commission's Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming compliance with this requirement.

TLSN-2 The project owner shall ensure that every reasonable effort will be made to identify and correct, on a case-specific basis, any complaints of interference with radio or television signals from operation of the project-related lines and associated switchyards.

The project owner shall maintain written records for a period of five years, of all complaints of radio or television interference attributable to operation of the plant and the corrective action taken in response to each complaint. Complaints not leading to a specific action or for which there was no resolution should be noted and explained. The record shall be signed by the project owner and also the complainant, if possible, to indicate concurrence with the corrective action or agreement, with the justification for a lack of action.

Verification: All reports of line-related complaints shall be summarized for the project-related lines and included for the first five years of plant operation in the Annual Compliance Report

TLSN-3 The project owner shall ensure engagement of a qualified consultant to measure the strengths of the line electric and magnetic fields before and after the lines are energized. Measurements should be made according to IEEE measurement protocols at the representative points within and along the edges of the rights-of-way for which the applicant provided field strength estimates.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 30 days after completion of the measurements.

TLSN-4 The project owner shall ensure that the right-of-way of the project-related lines are kept free of combustible material according to existing IID practices reflecting compliance with the provisions of Section 4292 of the Public Resources Code and Section 1250 of Title 14 of the California Code of Regulations.

Verification: At least 30 days before the line is energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

TLSN-5 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards.

Verification: At least 30 days before the line is energized, the project owner shall transmit to the CPM a letter confirming the intention to comply with this condition.

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VISUAL RESOURCES

James Adams

INTRODUCTION

Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether SSU6 Project would cause significant adverse visual impacts and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards. The determination of the potential for significant impacts to visual resources resulting from the proposed project is required by the California Environmental Quality Act (CEQA). The results of staff's analysis are summarized in **Visual Resources Appendix VR-1**.

This analysis is organized as follows:

- Description of analysis methodology;
- Description of applicable laws, ordinances, regulations and standards;
- Description of the project aspects that may have the potential for significant visual impacts;
- Assessment of the visual setting of the proposed power plant site and linear facility routes;
- Evaluation of the visual impacts of the proposed project on the existing setting;
- Evaluation of compliance of the project with applicable laws, ordinances, regulations, and standards;
- Identification of measures needed to mitigate any potential significant adverse impacts of the proposed project and to achieve compliance with applicable laws, ordinances, regulations, and standards.
- Conclusions and Recommendations; and
- Proposed Conditions of Certification

ANALYSIS METHODOLOGY

Visual resources analysis has an inherently subjective aspect. However, the use of generally accepted criteria for determining impact significance and a clearly described analytical approach aid in developing an analysis that can be readily understood.

SIGNIFICANCE CRITERIA

Commission staff considered the following criteria in determining whether a visual impact would be significant.

State

The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions

within the area affected by the project including...objects of historic or aesthetic significance” (Cal. Code Regs., tit.14, § 15382).

Appendix G of the Guidelines, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

Local

Energy Commission staff considers any local goals, policies, or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See the section on Laws, Ordinances, Regulations, and Standards.

IMPACT DURATION

The visual analysis typically distinguishes three different impact durations. **Temporary impacts** typically last no longer than two years. **Short-term impacts** generally last no longer than five years. **Long-term impacts** are impacts with a duration greater than five years.

VIEW AREAS AND KEY OBSERVATION POINTS

The proposed project is visible from a number of areas in the project region. Energy Commission staff evaluated the visual impact of the project from each of these areas. Staff used Key Observation Points¹, or KOPs, as representative locations from which to conduct detailed analyses of the proposed project and to obtain existing conditions photographs and prepare visual simulations. KOPs are selected to be representative of the most critical locations from which the project would be seen. However, KOPs are not the only locations that staff considered in each view area. Other locations included spots along local roads, residences within two miles of the proposed project, and the observation deck at the Sonny Bono Salton Sea National Wildlife Refuge.

EVALUATION PROCESS

For each view area, staff considered the existing visual setting and the visual changes that the project would cause to determine impact significance. Staff conducted a site visit and concluded that the KOPs presented in the Application for Certification (AFC) were appropriate for this analysis, however staff requested that three new KOPs be

¹ The use of KOPs or similar view locations is common in visual resource analysis. The US Bureau of Land Management and the US Forest Service use such an approach.

established. Existing condition photographs and computer simulations of the project from each KOP are presented with all other figures in **VISUAL RESOURCES Appendix VR-4**.

Elements of the Visual Setting

To assess the existing visual setting, staff considered the following elements.

Visual Quality

Visual quality is an expression of the visual impression or appeal of a given landscape and the associated public value attributed to the visual resource. This analysis used an approach that considers visual quality as ranging from outstanding to low. Outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as “picture postcard” landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

Viewer Concern

Viewer concern is a measurement of the level of viewer interest regarding the visual resources in an area. Official statements of public values and goals reflect viewers’ expectations regarding a visual setting. This analysis also employed land use as an indicator of viewer concern. Uses associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, and 4) residential areas are generally considered to have high viewer concern. However, existing landscape character may temper viewer concern on some State and locally designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements

Viewer Exposure

The visibility of a landscape feature, the viewing distance to the landscape feature, the number of viewers, and the duration of the view all affect the exposure of viewers to a given landscape feature. Visibility is highly dependent on screening and angle of view. The smaller the degree of screening and/or the closer the feature is to the center of the view area, the greater its visibility is. Increasing distance reduces visibility. Viewer exposure can range from low values for all factors, such as a partially obscured and brief background view for a few motorists, to high values for all factors, such as an unobstructed foreground view from a large number of residences.

Overall Visual Sensitivity

The overall level of sensitivity of a view area to impacts due to visual change is a function of visual quality, viewer concern, and viewer exposure and can range from low to high.

Types of Visual Change

To assess the visual changes that the project would cause, staff considered the following factors:

Contrast

Visual contrast describes the degree to which a project's visual characteristics or elements (consisting of form, line, color, and texture) differ from the same visual elements established in the existing landscape. The degree of contrast can range from low to high. The presence of forms, lines, colors, and textures in the landscape similar to those of a proposed project indicates a landscape more capable of accepting those project characteristics than a landscape where those elements are absent. This ability to accept alteration is often referred to as visual absorption capability.

Dominance

Dominance is a measure of a feature's apparent size relative to other visible landscape features and the total field of view (scale dominance). A feature's dominance is also affected by its relative location in the field of view (spatial dominance), and the distance between the viewer and the feature. The level of dominance can range from subordinate (low) to dominant (high).

View Disruption

View disruption describes the extent to which any previously visible landscape features are blocked, screened or degraded by the project. Disruption of higher quality landscape features by lower quality project features causes adverse visual impacts. The degree of view disruption can range from none to high.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following discussion of Federal, State, and Local laws, ordinances, regulations, and standards (LORS) is based on Section 5.12 of the Application for Certification (CEOE 2002a, AFC pages 5.12-18-19; AFC Supplement filings, and staff's review of Imperial County Planning documents).

FEDERAL

The proposed power plant is located on private land. Therefore, the project is not subject to federal regulations pertaining to visual resources. However, the preferred L transmission line would run through U.S. Bureau of Land Management (BLM) - managed lands and would require compliance with BLM aesthetic objectives. The BLM uses a Visual Resource Management (VRM) Inventory and Contrast Rating System to assess the existing visual setting and what activities or development would be appropriate. There are four classes related to the preservation of landscape character (CEOE 2002a, pg. 5.12-5):

Class I – The objective of this class is to preserve the existing character of the landscape. Changes to the landscape character should not be evident.

Class II – The objective of this class is to retain the existing character of the landscape. Changes to the landscape may attract attention but should be subordinate to the visual setting.

Class III – The objective of this class is to partially retain the existing character of the landscape. Changes to the landscape may begin to attract attention but should not dominate the visual setting.

Class IV – The objective of this class is to allow for activities that modify the existing character of the landscape. Changes to the landscape character may attract attention and dominate the visual setting. However, these activities should minimize changes to the landscape where possible.

STATE

There are no state designated scenic highways in the project vicinity and therefore, no state aesthetic LORS are applicable. However, a section of State Route (SR)-111 about 15 miles north of the project is designated eligible for scenic highway designation. This section extends into Riverside County. Motorists traveling south on the southern portion of the eligible scenic highway near the Salton Sea may be able to see plumes emanating from the project.

LOCAL

The proposed generating facility site, two transmission lines, and the water line would be located in unincorporated areas of Imperial County. Therefore, the proposed project would be subject to any local LORS pertaining to the protection and maintenance of visual resources in Imperial County. The Imperial County General Plan is the applicable document for guidelines related to development within the county. Four elements within the Plan are pertinent; Land Use; Circulation and Scenic Highways, and Geothermal and Transmission (which includes an in-depth discussion about transmission corridors that includes aesthetic considerations).

PROJECT DESCRIPTION

The following section describes the aspects of the project that may have the potential for significant visual impacts and includes the power plant and associated facilities, switchyard, electric transmission interconnections, geothermal well pipelines, and cooling tower and dilution water heater plumes.

The proposed generating facility would occupy 80 acres of a 160-acre parcel consisting of flat land just south of the Salton Sea about six miles northwest of Calipatria. The most visible features of the proposed project would include the steam turbine generator and crane, crystallizers, two cooling towers, two dilution water heaters, and four emergency relief tanks. See **Visual Resources Table 1** below for the dimensions of these and other project components.

Visual Resources Table 1
Dimensions of Key Project Components

| Component | Height (feet) | Length (feet) | Diameter Width (feet) |
|---|--------------------------|--------------------------|--------------------------------------|
| Steam Turbine Generator and Crane (1) | 99 | 100 | 190 |
| Crystallizers (8) | 55 | | 17 |
| Cooling Towers (2) | 58 | 538 | 58 |
| Dilution Water Heaters (2) | 45 | | 8 |
| Emergency Relief Tanks (4) | 45 | | 17 |
| Primary Clarifiers (2) | 34 | 100 | 130 |
| Secondary Clarifiers (2) | 32 | | 130 |
| Steam Vent Tanks (4) | 30 | | 32 |
| Transmission Towers * | 125 | | 10 |
| Source: CEOE 2002e, Response to CEC Data Adequacy Comments, Dated September 18, 2002, pg. 120 | | | |
| * CEOE 2002a, Application for Certification, Dated July 26, 2002, pg. 3-33 | | | |

ELECTRICAL TRANSMISSION INTERCONNECTION

Power generated by the proposed project would be transmitted over two new 161 kV transmission lines. One double circuit line would proceed southwest for 16 miles, cross SR-86 and connect with the Imperial Irrigation District's (IID) existing L-Line transmission line south of Bannister Road. The second single circuit transmission line would head south and east for 15 miles, cross SR-111 and connect to the existing IID Midway 230 kV substation. **Project Description Figure 2** in the **Project Description** section of this Preliminary Staff Assessment (PSA) shows the location of the proposed transmission lines. Both lines would be attached to 125-foot steel poles with 1,200 foot spans. Structures and conductors would be treated to reduce sun reflectivity and the new lines would parallel existing utility lines for most of their overall length (CEOE 2002a, pg. 5.12-14).

WATER SUPPLY PIPELINE

The proposed 500-foot-long, 10-inch underground pipeline would convey approximately 293 acre-feet of raw water per year to the service water pond from the IID Water Canal. The service water pond would be located at the southeast corner of the proposed project site.

PRODUCTION AND INJECTION WELLS AND PIPELINES

Ten production wells on five new pads, located near the project site, would be used when the plant is in full operation. Two of the wells would be located on the west and northern boundaries of the project site. One would be installed further west on Obsidian Butte and another would be located about 1000 feet north of SSU6. Seven injection wells would be located about 1.25 miles southeast of the project. The wells would be about 15 feet high. Pipelines would connect the wells to the plant. The estimated combined length of the pipelines would be approximately one mile. They would be about three feet above ground.

SETTING

REGIONAL LANDSCAPE

The proposed project would be located approximately 1,000 feet southeast of the Salton Sea in Imperial County. The region is characterized by flat agricultural lands supported by irrigation systems that supply water from the Colorado River. The topography of the local area is generally flat with slight rolling hills, with a few rock buttes and mountain ranges on all sides of the Imperial Valley. Much of the area is below sea level. The local mountain ranges include the Santa Rosa, Fish Creek, Coyote, and Jacumba Mountains to the west; the Chocolate Mountains to the northeast; Algodones Sand Dunes, Pichaco Peaks, and Cargo Muchacho Mountains to the southeast; and Palo Verde peak to the northeast (CEOE 2002a, pg. 5.12-2). The closest ranges to the site are the Santa Rosa Mountains, which are approximately 10 miles to the west and have an elevation of 5,000 to 6,000 feet; and the Chocolate Mountains which are 10 miles to the east with elevations of 1500 –2500 feet (USFWS 2003).

The rock buttes or domes are noticeable features in contrast to the flat valley floor. They include Obsidian Butte, Rock Hill, Mullet Island, and Red Hill (two domes). Elevations range from approximately 35 to 100 feet above the level of the Salton Sea. The closest domes to the project site are Rock Hill, which is within a mile to the north, and Obsidian Butte, which is a quarter-mile to the west. The Salton Sea Anomaly Master Environmental Impact Report (Salton MEIR) notes that the domes and the area surrounding these features is rated as having high scenic value and this designation extends out to a two-mile radius (County of Imperial 1981). The high scenic value is based on the recognition that the domes are relatively unique on the floor of the Imperial Valley. Signal Mountain, approximately 35 miles to the south, is a visible landmark and can be seen from the domes (e.g. Rock Hill).

The Sonny Bono Salton Sea Wildlife Refuge is less than a mile to the north of the proposed power plant site. The Red Hill Recreation Area is approximately two miles to the north and lies on the southeast shore of the Salton Sea (CEOE 2002a, pp. 1-3 and 5.12-8). Two small rivers flow through the general area. The Alamo River is approximately five miles southwest of the site and the New River is nearly three miles to the east. There are nine geothermal power plants within a two-mile radius of the proposed power plant site.

PROJECT VIEWSHED

The distance zones used within this analysis are defined as *foreground* (0 to 1/2 mile), *middleground* (1/2 to 2 miles), and *background* (beyond 2 miles). Within these zones of influence are a number of viewing opportunities. Most foreground to middleground views of the proposed project would be limited to adjacent and nearby roadways, agricultural lands and buttes. The power plant would be noticeably visible from, Severe, Peterson, Gentry, Grubel, McKendry, Boyle, and Kuns/Montgomery Roads. Viewers would typically be agricultural workers and residents travelling in directions toward the project site. There are very few, scattered rural residences along the roads referenced above. The project would also be visible from the trail up to Rock Hill and Obsidian

Butte. **Visual Resources Figure 1** shows the project site, the Salton Sea, roads, KOPs and other features within the local area.

IMMEDIATE POWER PLANT VICINITY

The visual character of the immediate project vicinity reflects two types of human use. In addition to being an agricultural landscape devoted to large-scale crop production, it is also a landscape with an industrial character due to the presence of nine geothermal power plants. These uses are visible in the open, panoramic agricultural scene on a flat landscape. The IID water canal runs by the southeast corner of the proposed site.

The immediate vicinity also includes a residence approximately three-quarters of a mile to the northeast within the Refuge Headquarters, and the Rock Hill public viewing area is about a mile north of the proposed site.

CONSTRUCTION LAYDOWN AREAS

The proposed construction parking and laydown areas would be located within the 160 acre parcel, which includes the power plant.

VIEWING AREAS AND KEY OBSERVATION POINTS

Staff evaluated the proposed key observation points (KOPs) chosen by the applicant and determined that three additional KOPs were necessary for this analysis. The first additional KOP is the view looking south from the top of Rock Hill toward the project site and the vista beyond. The second is a view of the L-Line interconnection transmission line as it crosses SR-86, about ten miles southwest of the project site. The third KOP is a view of the IID Midway interconnection transmission line as it crosses SR-111, about seven miles east of the project site.

Each of these key observation points is shown on **Visual Resources Figure 1**. At each KOP a visual analysis was conducted, a summary of which is presented in **Appendix VR-1**. Existing condition photographs and photo-simulations from each KOP are presented in **Appendix VR-4**. A discussion of the visual setting for each KOP is presented in the following paragraphs.

KOP 1-Entrance to Sonny Bono Wildlife Refuge

Visual Resources Figure 1A shows the view from an agricultural access road off Sinclair Road near the Wildlife Refuge headquarters, located about 4,000 feet from the site. The entrance to the refuge is about 600 feet to the east (or left) of the KOP. Visitors entering the Refuge see the site. Figure 1A is somewhat representative of the existing view experienced by people entering the Refuge. Although, because the photo was taken 600 feet to the west of the entrance, the project site appears closer than it really does from the entrance. Staff intends to provide an existing view photograph.

Visual Quality

The most prominent features from this KOP are the canal, agricultural fields, existing geothermal units to the south and west, the Cargo Muchacho Mountains, and the sky. Other visible features are the dirt berm on the opposite side of the canal, low growing

vegetation and telephone poles, and the berm and vegetation on the horizon. Visual quality is low to moderate.

Viewer concern

The predominant viewers at KOP-1 would be visitors to the Refuge and the agricultural workers who use the access road. Viewers anticipate seeing existing geothermal units. Viewer concern would be moderate.

Viewer Exposure

Visibility is moderate to high because of the 0.75-mile distance to the site in the middleground. There are no obstructions that would block view of the site. The number of viewers is high given the 12,000 to 18,000 visitors to the Refuge during the past two years. Duration of view is moderate and would be experienced when the visitors used Sinclair Road to enter the Refuge. Overall viewer exposure is moderate to high.

Overall Visual Sensitivity

For KOP-1, the low to moderate visual quality, moderate concern and high viewer exposure results in a moderate to high overall visual sensitivity.

KOP 2-Red island recreational area

KOP-2 represents the view from the Red Island Recreation Area approximately two miles north of the project site. This viewpoint was selected because of the number of visitors (40,000 to 60,000 annually) that use the Recreation Area. **Visual Resources Figure 2A** shows the existing view from KOP-2 to the southwest toward the project site.

Visual Quality

The most prominent features in this view are the recreation area in the foreground, Salton Sea in the middleground, Rock Hill and an agricultural area in the middleground, and Santa Rosa Mountain range in the background. Rock Hill would partially block the view of the project. Other features visible to viewers from KOP-2 are existing geothermal facilities in the middleground. Visual quality is high.

Viewer Concern

The large number of visitors to the recreation area would be the predominate viewers at KOP-2. Viewers would anticipate seeing a scenic vista of the Salton Sea and mountain ranges with some geothermal power plants. Viewer concern is moderate.

Viewer Exposure

Visibility of the project is moderate given the distance from the recreation area. The number of visitors is high and the duration of the view is moderate. Overall exposure is moderate to high.

Overall Visual Sensitivity

For KOP-2, the high visual quality, the moderate to high viewer concern and moderate to high viewer exposure result in a moderate to high overall visual sensitivity.

KOP 3-Residence on Lack Road

KOP-3 is the view from a residence on the west side of Lack Road looking northeast toward the project, which is approximately three miles away. This viewpoint was selected because the L-Line interconnection transmission line heading south of the project would be on the east side of Lack Road and would be visible from the residence and motorists using Lack Road. **Visual Resources Figure 3A** shows the existing view from KOP-3 looking northeast toward the project site.

Visual Quality

The most prominent features in this view are Lack Road, the canal on the west side of Lack Road and the Chocolate Mountain ranges in the background. Other visible features include the existing utility line, agricultural lands west and east of Lack Road, and existing geothermal facilities in the far middleground to background. Overall visual quality is low to moderate.

Viewer Concern

The predominate viewers from KOP-3 are the occupants of the residence next to Lack Road. In general, viewer concern is high for residences because they see the view every day. In addition, workers who use this road on a daily basis anticipate a view of agricultural and geothermal activities. Viewer concern is high.

Viewer Exposure

Visibility of the project transmission line is high because it would run along the east side of Lack Road for three miles. The number of residents is low. The number of motorists is also quite low (160 vehicles per day [CEOE 2002a, pg. 5.12-7]). Duration of the view for the residence near KOP 3 is high. Duration of the view for motorists is moderate. Overall viewer exposure is moderate to high.

Overall Visual Sensitivity

For KOP-3, the low to moderate visual quality, the low to moderate viewer concern, and the moderate to high viewer exposure result in a low to moderate visual sensitivity.

KOP 4 – Top of Rock Hill

KOP 4 was selected to represent the view to the south from the top of Rock Hill within the Sonny Bono Wildlife Refuge. This viewpoint is approximately one mile north of the proposed site. **Visual Resources Figure 4A** shows the existing view from KOP-4 looking south toward the project site.

Visual Quality

From this viewpoint, the most prominent features in the existing landscape are the Salton Sea in the fore and middleground, the Rock Hill Trail, and agricultural areas to the east and south. The background view encompasses the Cargo Muchacho Mountains to the south and southeast, including Signal Mountain in Mexico, approximately 35 miles away. As noted earlier, the Salton MEIR considers the area within two miles of Rock Hill to have high scenic value. Other visible features include existing geothermal units in the middleground. The overall landscape character is a

combination of rural agricultural and industrial with a portion of the Salton Sea to the south and west. Visual quality is high.

Viewer Concern

Rock Hill is within the Salton Sea Wildlife Refuge and the proposed project, as well as existing geothermal projects, would be visible to visitors and recreationists from the top of Rock Hill. There are a number of interpretive signs at the top of Rock Hill including one that identifies Signal Mountain on the horizon and notes that it is in Mexico. Viewers would also anticipate having an unobstructed view of Signal Mountain. Any additional viewer disruption of the surrounding mountains would be perceived as an adverse visual change. Viewer concern is high.

Viewer Exposure

Visibility of the project site is moderate to high from KOP-4, with the proposed site in the near middleground of the view. Between 12,000 and 18,000 people have visited the Wildlife Refuge Headquarters each of the last two years and the vast majority (98 percent) take the trail to Rock Hill (USF&W 2003). The view of the site from KOP 4 is open and unobstructed. The number of viewers is high. The duration of view is moderately high considering most viewers would likely spend much of their time looking toward the west and north at the Salton Sea and nearby mountains. Overall viewer exposure is moderate to high.

Overall Visual Sensitivity

For KOP-4, the high visual quality combines with the moderate to high viewer concern and moderate to high exposure, resulting in a moderate to high overall visual sensitivity.

KOP 5 – L-Line Interconnection Transmission Line

KOP 5 represents the view to the northwest from westbound motorists on SR-86, near the intersection with Bannister Road. This viewpoint is taken approximately 600 feet southeast from the location where the L-Line interconnection line crosses SR-86. From this location and a similar location 600 feet west of the transmission line crossing, the proposed transmission line would be located prominently within the view of motorists traveling in either direction. SR-86 has an estimated ADT of 8,100 vehicles per day (CEOE 2002a, pg. 5.10-21). This view is also representative of the views from two residences near this portion of SR-86. **Visual Resources Figure 5A** shows the existing view from KOP-5 looking northwest at SR-86.

Visual Quality

From this viewpoint, the most prominent features in the existing landscape are the flat, open agricultural fields that occupy much of the foreground and middleground to the left (west) and right (east) of the highway. SR-86 occupies the center of the view along with electric transmission lines running along side the highway. Depending on weather conditions, the Santa Rosa Mountains may be visible. Visual quality of this rural agricultural landscape is moderate.

Viewer Concern

Northwest bound motorists on SR-86 anticipate a foreground to middleground rural agricultural landscape view with mountains in the background. Transmission lines parallel the highway and are part of the scenery. A new transmission line that crosses SR-86 could be perceived as a mildly adverse visual change. Occupants of the two residences would have a high concern if the towers are close to their property. Motorists would have a moderate concern. Overall viewer concern is moderate.

Viewer Exposure

Visibility of the project is moderate to high because the transmission towers on either side of the highway would be in the center of motorist's view. The towers would appear co-dominate at KOP-5. However, the towers could be seen from one or two miles away though they would appear low on the horizon and be subordinate to the Santa Rosa Mountains. Their visibility and size would increase as motorists approached the transmission line crossing. The number of motorists, 8,100 per day, is moderate to high and duration of view is low because vehicles would approach and pass the transmission line crossing quickly. If the towers were built close to the two residences, the occupants would experience high viewer exposure. The high number of motorists with a low duration of view leads to a moderate exposure. The overall viewer exposure is moderate to high.

Overall Visual Sensitivity

For northwest bound motorists on SR-86, the moderate visual quality, moderate viewer concern, and moderate to high viewer exposure result in a moderate visual sensitivity for KOP-5.

KOP 6 – IID Midway Interconnection Transmission Line

KOP 6 represents the view to the north as seen by northbound motorists on SR-111, near the intersection with Hooper Road. This viewpoint is approximately 600 feet south from the place where the transmission line crosses SR-111. From this location and a similar location 600 feet north of the transmission line crossing, the proposed transmission line would be located within the view of motorists traveling in either direction. SR-111 has an estimated ADT of 7,100 vehicles per day (CEOE 2002a, pg. 5.10-21). **VISUAL RESOURCES Figure 6A** shows the existing view from KOP-6.

Visual Quality

From this viewpoint looking north, the most prominent features in the existing landscape are the flat desert to the east and west, and the Chocolate Mountains in the background. SR-111 occupies the center of the view along with telephone lines running along side the highway. Visual quality from KOP-6 is moderate.

Viewer Concern

Northwest bound motorists on SR-111 anticipate a desert landscape view with mountains in the background. Transmission lines parallel the highway and are part of the scenery. A new transmission line that crosses over, and towers on either side of

SR-111 could be perceived as a mildly adverse visual change. Overall viewer concern is moderate.

Viewer Exposure

Visibility of the project is moderate to high because the transmission towers on either side of the highway would be in the center of motorist's view. However, the towers could be seen from one or two miles away though they would appear low on the horizon and subordinate to the Santa Rosa Mountains. Their visibility and size would increase as motorists approached the transmission line crossing. The number of viewers, at least 7,100, is moderate to high and duration of view is low because vehicles approach and pass the transmission line crossing quickly. Overall viewer exposure is moderate.

Overall Visual Sensitivity

For northwest bound motorists on SR-111, the moderate visual quality, moderate viewer concern, and moderate viewer exposure result in an overall moderate visual sensitivity.

IMPACTS

CONSTRUCTION IMPACTS

Construction of the proposed power plant and linear facilities would cause temporary adverse visual impacts due to the presence of equipment, materials, and workforce. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. Construction would include site clearing and grading, trenching, construction of the actual facilities, and site and rights-of-way cleanup and restoration. The proposed project construction would occur over a 26-month period. Construction would occur during a single-shift, 10 hour day, five days a week (CEOE 2002a, pg. 5.9-7). Due to the relatively short-term nature of project construction, the adverse visual impacts that would occur during construction would not be significant. However, this conclusion assumes that complete restoration of construction areas and rights-of-way is accomplished. Condition of Certification **VIS-1** would ensure that the visual impacts associated with project construction remain less than significant.

OPERATION IMPACTS

An analysis of operation impacts was conducted for the view areas represented by the KOPs selected for in-depth visual analysis. The results of the operation impact analysis is discussed below, by KOP, and presented in the Visual Analysis Summary table included as **Visual Resources Appendix VR-1**. The visual impacts of vapor plume formation and night lighting are discussed in separate sections of this analysis. For each KOP, an evaluation of visual contrast, project dominance, and view disruption is presented with a concluding assessment of the overall degree of visual change caused by the proposed project.

Impacts of Power Plant Structures

As noted earlier, the most visible features of the proposed project would include the 99 foot tall steam turbine generator and crane, eight 55 foot tall crystallizers, two 58 foot tall

cooling towers, two 45 foot tall dilution water heaters, and four 45 foot tall emergency relief tanks.

KOP 1 – Entrance to national wildlife refuge

Visual Resources Figure 1B presents a visual simulation of the proposed project as viewed from KOP 1 at a point approximately 600 feet west of the entrance to the Refuge Headquarters. This simulation roughly depicts what viewers at the entrance to the Refuge headquarters would see. Staff's **Visual Resources Figure 1C** shows the view from the entrance to the Refuge. Staff intends to provide a photo-simulation from the actual entrance in the Final Staff Assessment. The analysis below applies to view from the entrance to the Refuge.

Visual Contrast

The proposed project would introduce the prominent geometric forms and vertical and horizontal lines of the various structures and stacks. These structural characteristics would be consistent with the forms and lines related to the existing geothermal plants. The proposed tan color of the project structures would blend in with color of existing geothermal plants but would contrast with green color of the agricultural fields in the local area. The resulting visual contrast would be moderate.

Project Dominance

The rural agricultural landscape visible from KOP 1 is dominated by the flat, horizontal form of the valley floor, the existing geothermal unit in the middleground (one-half mile from the viewpoint), and the mountain range in the background. There are other geothermal units approximately two miles away in the middle background. The proposed power plant facilities would be approximately one mile away and spatially prominent in the center of the view of this highly exposed site. The project would appear co-dominant with the existing landforms in the view. Overall project dominance is moderate.

View Disruption

From KOP 1 the vertical structures and stacks and horizontal structures (lower quality landscape features) would disrupt the view of portions of the mountain range in the background (higher quality landscape features). However, this noticeable view disruption would be of short duration as a vehicle's position relative to the project site changes. Also, most of the mountain range would be visible and the berm and trees along the north side of the irrigation canal would block much of the view quickly for viewers entering the Refuge Headquarters. The resulting view disruption would be low.

Overall Visual Change

From KOP 1, the overall visual change caused by the proposed project would be moderate due to the moderate degree of contrast, the project's co-dominate relation with existing land features, and low degree of view disruption of higher quality landscape features.

Visual Impact Significance

When considered within the context of the overall moderate visual sensitivity of the existing landscape and viewing characteristics, and the moderate visual change that would be perceived from KOP 1 would cause an adverse but less than significant visual impact.

KOP 2 –Red Island Recreation Area

VISUAL RESOURCES Figure 2B presents a visual simulation of the proposed project as viewed from KOP 2, from the Red Island Recreation Area, about two miles north of the project site. The presence of Rock Hill between KOP-2 and the site would partially screen the new geothermal unit. Also, the project would blend in to some degree with other geothermal power plants in the area.

Visual Contrast

The proposed project would introduce another geothermal unit with geometric forms and vertical and horizontal lines into the view to the south from KOP-2. These structural characteristics would be consistent with the existing forms and lines established by the adjacent geothermal unit. The project structures would contrast with the forms and lines of the Salton Sea and the Cargo Muchacho Mountain Range, which are flat and horizontal. Because of the distance to the project site from this KOP, the tan color of the structures would blend in with surrounding land features. The resulting visual contrast would be low.

Project Dominance

The landscape visible from KOP 2 is dominated by the Recreational Area in the foreground and the Salton Sea in the middle and background. In addition, the mountain ranges in the background are a noticeable feature of the landscape from this KOP. The proposed power plant facilities would not be spatially prominent because of the low profile on the horizon and the mountains in the background. Also, the scale of these introduced forms and structural masses would be substantially the same as other developed features in the immediate project vicinity. The project would appear subordinate to the overall landscape. Overall project dominance would be subordinate or low.

View Disruption

From KOP 2 the proposed project structures (lower quality landscape features) would not disrupt the view of the Salton Sea or the mountain range in the background because the project is two miles away and would appear low on the horizon. The proposed project's resulting view disruption would be low.

Overall Visual Change

From KOP 2, the overall visual change caused by the proposed project would be low due to the low degree of contrast, subordinate structures, and low degree of view disruption.

Visual Impact Significance

When considered within the context of the overall moderate to high visual sensitivity of the existing landscape and viewing characteristics, the low visual change that would be perceived from KOP 2 would cause an adverse but less than significant visual impact.

KOP 3 – Residence on Lack Road

Visual Resources Figure 3 presents a visual simulation of the proposed project as viewed from KOP 3, a residence on the west side of Lack Road, approximately three miles from the project site. This KOP also represents the view for motorists traveling northbound on Lack Road. The most obvious change to the landscape would be the introduction of a new transmission line and supporting towers along Lack Road for approximately three miles. The resulting structural mass would be noticeably greater than that of the existing telephone line along the west side of Lack Road.

Visual Contrast

The project would introduce the horizontal form of the transmission lines and several prominent vertical electric transmission towers. These structural characteristics would be somewhat consistent with the existing forms and lines established by the adjacent utility line, although inconsistent with the generally horizontal agricultural land. The gray color of the towers would contrast highly with the tan and brown color of the Chocolate Mountains, and moderately with the blue sky. The overall visual contrast would be moderate at this viewing distance.

Project Dominance

The rural agricultural landscape visible from KOP 3 is dominated by the flat, horizontal form of the valley floor, including Lack Road, agricultural fields, and the vertical form of roadside utility poles. The project transmission line and towers would be spatially prominent for viewers travelling on Lack Road and the occupants of the residence. The scale of the new towers relative to existing utility lines would range from low for distant towers to moderate for towers closer to the viewer. The tower nearest the residence would dominate the existing landscape features. The sky and mountain range backdrop to the nearest towers and line would contribute to their structural prominence. Overall project dominance would be co-dominant (moderate).

View Disruption

From KOP 3 the proposed transmission line and towers closest to Lack Road would disrupt a small portion of the view of the sky and valley floor near the horizon line. The towers, particularly the one closest to the Lack Road residence, would disrupt the viewshed and divide up the sky. The proposed project's resulting view disruption would be moderate to high.

Overall Visual Change

From KOP 3, the overall visual change caused by the proposed project would be moderate to high due to the moderate degree of contrast that would result from the project's co-dominant structures, combined with the project's moderate to high degree of view disruption of the sky, mountains, and valley floor.

Visual Impact Significance

When considered within the context of the overall moderate visual sensitivity of the existing landscape and viewing characteristics, the moderate to high visual change that would be perceived from KOP 3 would cause an adverse and significant visual impact.

KOP 4–View from Rock Hill

Visual Resources Figure 4B presents a visual simulation of the proposed project from KOP 4 on top of Rock Hill. The simulation is looking south toward the project site about one mile away. The most obvious change to the landscape would be the introduction of a new and larger geothermal unit in a predominately rural agricultural area adjacent to the Salton Sea.

Visual Contrast

The project would introduce horizontal and vertical lines and geometric forms similar to the existing geothermal units but different than the flat agricultural areas and the Salton Sea. The tan color of the project structures would contrast with green agricultural areas, the tan and brown color of the Cargo Muchacho Mountains, and the blue Salton Sea. The project structures would differ from the natural features of the landscape such as the agricultural fields, mountain range, and the Salton Sea. In addition, the water heater dilution stack would generate a large plume (see visible plume analysis below). The resulting visual contrast would be moderate to high.

Project Dominance

The rural landscape from KOP 4 is dominated by the Salton Sea in the fore and middleground, agricultural land and the Cargo Muchacho Mountain range, including Signal Mountain, in the background. The proposed project would be spatially prominent, in the center of the view for viewers looking at Signal Mountain and the mountain range. The mountain range backdrop to the project would reduce the structural prominence of the proposed facilities. The scale of the project would appear co-dominate with the existing landscape features. Overall project dominance would be co-dominant (moderate).

View Disruption

From KOP 4, the full length and form of the new geothermal unit structures and plume (lower quality landscape features) would be visible. The proposed project would block a substantial portion of the view of agricultural fields and horizontal landscape to the south from KOP 4. It would also disrupt the view of Signal Mountain and the Cargo Muchacho Mountains. Overall view disruption would be moderate.

Overall Visual Change

From KOP 4, the overall visual change caused by the proposed project would be moderate to high due to the moderate change in contrast, the co-dominance of the new unit, and the moderate to high disruption.

Visual Impact Significance

When considered within the context of the overall moderate to high visual sensitivity, and the moderate to high overall visual change, the project would cause an adverse and significant impact from KOP 4. Staff has proposed Conditions of Certification **VIS-2, 3, 5, and 6** to mitigate this impact to a less than significant level.

KOP 5 Transmission Line Crossing of SR-86

Visual Resources Figure 5B presents a visual simulation of the interconnection transmission line crossing SR-86 about 12 miles southwest of the project site. The site of the simulation is about 600 feet south of the highway crossing. The major change to the landscape would be the introduction of the new transmission lines and supporting towers. The towers would be substantially larger than the existing utility poles that runs along side SR-86.

Visual Contrast

The proposed project would introduce the prominent vertical forms of transmission line towers and the horizontal oriented transmission lines. This would contrast with horizontal forms and line of the desert landscape in the fore and midground, and the Santa Rosa Mountains in the background. The silver/gray color of the new towers would contrast highly with the brown utility poles, tan desert floor, dark mountains, and contrast moderately with the blue sky. The resulting visual contrast would be moderate to high.

Project Dominance

The rural landscape visible from KOP 5 is dominated by SR-86 and the flat desert landscape in the fore and middleground, with the Santa Rosa Mountain range in the background. An existing utility line and poles runs along the north side of SR-86. The project transmission line and towers would cross over the highway and would be spatially prominent within motorists primary view direction. The sky backdrop to the transmission towers and line would contribute to their structural prominence. The transmission towers would be spatially dominant within motorists primary view direction. The scale of the new towers and line would briefly appear dominant in the view for viewers travelling on SR-86. The towers could be co-dominate or dominate for the two residences depending on where they are located. Overall, the transmission line and towers would be dominate.

View Disruption

From KOP 5, the transmission line and towers would disrupt a small portion of the view of the landscape and sky. Motorists traveling in either direction would notice the transmission towers a mile or two before arriving at KOP 5. The towers would appear larger as motorists approached the area where the line crosses SR-86. The towers would disrupt a small portion of the view of the landscape for a short period of time until motorists passed underneath the transmission line. The towers could also disrupt the view of the two residences depending on where they are located. The resulting blockage and disruption would be low to moderate.

Overall Visual Change

From KOP 5, the overall visual change would be moderate due to the moderate to high degree of contrast that would occur from the project's co-dominant structures, combined with low to moderate degree of disruption.

Visual Impact Significance

When considered within the context of the low to moderate sensitivity of the existing landscape and viewing characteristics, the moderate to high visual change would cause an adverse but less than significant visual impact.

KOP 6 - Transmission Line Crossing of Sr-111

Visual Resources Figure 6B presents a visual simulation of the interconnection transmission line crossing SR-111 about six miles east of the project site. The viewpoint depicted in the simulation is about 600 feet south of the highway crossing. The major change to the landscape would be the introduction of the new transmission lines and vertical supporting towers. The towers would be substantially larger than the existing utility poles that run along the eastside of SR-111.

Visual Contrast

The proposed project would introduce the prominent vertical forms of transmission line towers and the horizontal oriented transmission line. The forms and line of the new towers and transmission lines would be similar to existing utility poles and line but noticeably different than the flat horizontal form of the agricultural fields. The silver/gray color of the new towers would contrast highly with the brown utility poles, and tan desert floor, and contrast moderately with the blue sky. The resulting visual contrast would be moderate to high.

Project Dominance

The rural landscape visible from KOP 6 is dominated by SR-111 and the flat desert landscape in the fore and midground, with the Chocolate Mountain range in the background. The project transmission line and towers would cross over the highway and would be spatially prominent within motorist's primary view direction. The sky backdrop to the transmission towers and lines would contribute to their prominence. The scale of the new towers and lines would briefly appear dominant relative to desert landscape, Santa Rosa Mountains and the total view. Overall, the transmission line and towers would dominate the major features of the landscape.

View Disruption

From KOP 6, the transmission lines and towers would block a small portion of the view of the landscape and sky. Motorists traveling in either direction would notice the transmission towers. The towers would disrupt the view of a small portion of the landscape for a short period of time until motorists passed underneath the transmission lines. The towers would cause a small degree of disruption of the scenic vista of desert landscape and Santa Rosa Mountains as motorists approached the transmission line crossing. The resulting blockage and disruption would be low to moderate.

Overall Visual Change

From KOP 6, the overall visual change would be moderate to high due to the moderate to high degree of contrast, dominant nature of the tower, combined with the project's low to moderate degree of disruption of higher quality landscape features (sky and mountains).

Visual Impact Significance

When considered within the context of the low to moderate sensitivity of the existing landscape and viewing characteristics, the moderate to high visual change would cause an adverse but less than significant visual impact.

Linear facilities

The proposed project involves associated facilities such as the interconnection transmission lines, injection and production wells, and associated pipelines. This analysis will discuss the potential visual impacts related to these facilities.

Interconnection transmission lines

The project would have two interconnection transmission lines; one double-circuit line will proceed southwest for 16 miles, cross SR-86 and connect with the IID's L-Line transmission line south of Bannister Road. The second single-circuit transmission line would head south and east of the project for 15 miles, cross SR-111 and connect to the existing IID Midway 230 kV substation. The applicant intends to build the new transmission lines parallel to existing linear facilities to the extent possible (CEOE 2003a, pg. 5.12-14). Staff analyzed the potential impacts of these two transmission line crossings in KOP 5 and 6 above.

Production/Injection Wells and Associated Pipelines

The proposed project involves production and injection wells that capture the geothermal effluent for extracting steam and minerals, and for returning the brine solution to the subsurface where it migrates back to the production area. There would be 10 production wells on five well pads that would be within approximately 1,000 feet of the power plant. One of the well pads is proposed to be located on Obsidian Butte. The fluid would flow through above ground pipes, three feet above ground, to the power plant (CEOC 2002a, pg.3-4).

Six injection wells on three well pads would be located within two miles of the power plant. The brine effluent would be transported from the plant to the injection wells via three-mile long, 24 or 30-inch diameter above ground pipes about three feet above grade (CEOC 2002a, pg. 3-11 & 28). The production and injection wells are approximately 15 feet high.

The wells and pipelines would be visible to motorists and agricultural workers in the local area, particularly if they are incased in shiny aluminum jackets or are painted with reflective paint. The production wells are located in a relatively remote corner of the agricultural area. Obsidian Butte is owned by IID and public access is not allowed. The wells may partially disrupt part of the panoramic view. Given the size of the wells and

pipelines, and the relatively low number of residents and motorists, the visual change would be low to moderate. Therefore, the visual impact would be low to moderate

Lighting

The proposed project would be located in a rural agricultural area, which has relatively minimal existing night lighting except for clusters of lights at the existing geothermal power plants. The proposed project would require nighttime lighting for operational safety and security though the project would not be required to have FAA beacons. Lighting would be directed on site to avoid back-scatter, and shielded from public view to the extent practical. (CEOE 2002a, p. 5.12-12 & 13). High illumination areas not occupied on a regular basis would be provided with switches or motion detectors to light these areas only when occupied.

Glare from night lighting is currently generated by existing geothermal units and the incremental increase from the new power plant is not expected to significantly increase night lighting, back-scatter light, or glare. However, the applicant states that during construction, slightly higher amounts of back-scatter lighting may be apparent to a nearby observer (CEOE 2002a, pg. 5.12-12). Condition of Certification **VIS-4** would reduce offsite light trespass to a less than significant level.

Visible Plumes

Staff conducted an independent modeling analysis of project vapor plumes associated with the proposed cooling tower and water heater dilution stack (Aspen 2003a and b). In order to model the cooling tower and water heater plumes, staff used the following information provided by the applicant: a) CEOE 2002a, pg 5.1-28; b) Data Responses Set 1 (CEOE 2002l, p. 88). The following discussion is a summary of the plume analysis. For the complete analysis please see **Appendix VR-2**.

Cooling Towers

Staff performed an independent dispersion modeling analysis to predict the frequency and dimensions of visible plumes from the project's proposed unabated cooling towers. For the SACTI model, a single tower (10-cells) was modeled, as the two towers are separated by approximately 766 feet (233 meters). Staff's SACTI modeling analysis visible plume dimension results, for a single tower, using a five-year (1995-1999) meteorological data set from Imperial County Airport and upper air data from Tucson, AZ are provided in **Visual Resources Table 2**.

Visual Resources Table 2
Staff Results of Cooling Tower Visible Plume Dimensions
Imperial County Airport 1995-1999 Meteorological Data

| Case | Model | Percentile | 50% | 10% | 5% | 1% | Maximum |
|---|-------|--------------|----------|----------|----------|---------|-----------|
| All Hours | SACTI | Length (m)** | 20-30 | 50-60 | 50-60 | 200-300 | 600-700 |
| | CSVP | | No Plume | 9 | 77 | 214 | 682 |
| | SACTI | Height (m)* | 10-20 | 40-50 | 40-50 | 60-70 | 600-700 |
| | CSVP | | No Plume | 33 | 99 | 261 | 733 |
| | SACTI | Width (m) | 20-40 | 40-60 | 40-60 | 80-100 | 400-600 |
| | CSVP | | No Plume | 40 | 55 | 66 | 86 |
| Daytime No Rain / No Fog | SACTI | Length (m)** | 10-20 | 20-30 | 40-50 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | No Plume | 50 | 357 |
| | SACTI | Height (m)* | 10-20 | 20-30 | 20-30 | 20-30 | 300-400 |
| | CSVP | | No Plume | No Plume | No Plume | 112 | 598 |
| | SACTI | Width (m) | 20-40 | 20-40 | 20-40 | 20-40 | 120-140 |
| | CSVP | | No Plume | No Plume | No Plume | 54 | 76 |
| Seasonal Daylight No Rain / No Fog | SACTI | Length (m)** | 10-20 | 20-30 | 50-60 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | 11 | 92 | 357 |
| | SACTI | Height (m)* | 10-20 | 20-30 | 20-30 | 30-40 | 300-400 |
| | CSVP | | No Plume | No Plume | 44 | 196 | 598 |
| | SACTI | Width (m) | 20-40 | 20-40 | 20-40 | 40-60 | 120-140 |
| | CSVP | | No Plume | No Plume | 44 | 61 | 76 |
| Seasonal Daytime "Clear" | SACTI | Length (m)** | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 59 | 334 |
| | SACTI | Height (m)* | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 129 | 471 |
| | SACTI | Width (m) | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 57 | 76 |

Seasonal = November through April (day 120-304).

*SACTI Plume height does not include the height (17.68 meters) of the cooling tower (release point).

**Plume length from tower. Each of the two towers are 164 meters long, so the actual plume length will also include some component of the tower length.

As **Visual Resources Table 2** shows, the Combustion Stack Visible Plume (CSVP) model predicts no plumes 50 percent of the time for all cases. Additionally, the CSVP model only predicts plumes 10 percent of the time for all hours. Predicted plume sizes from CSVP are similar to those predicted by the SACTI model, except for the width, which is much smaller than the widths predicted by SACTI. While the CSVP model does have certain limitations, such as no specified mixing height to limit maximum plume heights, it uses actual hourly meteorological data and can model "calm" hours assuming a minimum wind speed; while the SACTI model groups the meteorological data and does not process "calm" hours. Therefore, staff concludes that the CSVP modeling results, which also includes the variable load characteristics of the cooling tower with respect to variable ambient conditions, should provide more realistic visible plume characteristics.

A plume frequency threshold of 10 percent of seasonal (November through April) daylight no rain/fog high visual contrast (i.e. "clear") hours analysis is used to determine potential plume impact significance. The high visual contrast hours analysis methodology is provided below:

The Energy Commission management has identified a "clear" sky category during which plumes have the greatest potential to cause adverse visual impacts. For this project the

meteorological data set² used in the analysis categorizes total sky cover and opaque sky cover in six categories. Staff has included in the “Clear” category a) all hours with total sky cover categorized as clear b) half of the hours with sky cover categorized as scattered or broken. Hours with total sky cover categorized as overcast, partially obscured or obscured were not considered “clear” hours. The rationale for including these three sky cover categories is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10 percent, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-100 percent and the opacity of sky cover is relatively low (equal to or less than 50 percent), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria can be considered high visual contrast hours and are included in the “clear” sky definition.

Visual Resources Table 3 shows the visible cooling tower plume dimensions.

**Table 3 – Staff Results of Cooling Tower Visible Plume Dimensions
Imperial County Airport 1995-1999 Meteorological Data**

| Case | Model | Percentile | 50% | 10% | 5% | 1% | Maximum |
|---|-------|---------------|----------|----------|----------|---------|-----------|
| All Hours | SACTI | Length (ft)** | 66-98 | 164-197 | 164-197 | 656-984 | 1968-2296 |
| | CSVP | | No Plume | 29 | 253 | 702 | 682 |
| | SACTI | Height (ft)* | 10-20 | 40-50 | 40-50 | 60-70 | 600-700 |
| | CSVP | | No Plume | 33 | 99 | 261 | 733 |
| | SACTI | Width (ft) | 20-40 | 40-60 | 40-60 | 80-100 | 400-600 |
| | CSVP | | No Plume | 40 | 55 | 66 | 86 |
| Daytime No Rain / No Fog | SACTI | Length (ft)** | 10-20 | 20-30 | 40-50 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | No Plume | 50 | 357 |
| | SACTI | Height (ft)* | 10-20 | 20-30 | 20-30 | 20-30 | 300-400 |
| | CSVP | | No Plume | No Plume | No Plume | 112 | 598 |
| | SACTI | Width (ft) | 20-40 | 20-40 | 20-40 | 20-40 | 120-140 |
| | CSVP | | No Plume | No Plume | No Plume | 54 | 76 |
| Seasonal Daylight No Rain / No Fog | SACTI | Length (ft)** | 10-20 | 20-30 | 50-60 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | 11 | 92 | 357 |
| | SACTI | Height (ft)* | 10-20 | 20-30 | 20-30 | 30-40 | 300-400 |
| | CSVP | | No Plume | No Plume | 44 | 196 | 598 |
| | SACTI | Width (ft) | 20-40 | 20-40 | 20-40 | 40-60 | 120-140 |
| | CSVP | | No Plume | No Plume | 44 | 61 | 76 |
| Seasonal Daytime “Clear” | SACTI | Length (ft)** | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 59 | 334 |
| | SACTI | Height (ft)* | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 129 | 471 |
| | SACTI | Width (ft) | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 57 | 76 |

Seasonal = November through April (day 120-304).

*SACTI Plume height does not include the height (17.68 meters) of the cooling tower (release point).

**Plume length from tower. Each of the two towers are 164 meters long, so the actual plume length will also include some component of the tower length.

As **Table 3** shows, the CSVP model predicts no plumes 50 percent of the time for all cases. Additionally, the CSVP model only predicts plumes 10 percent of the time for all hours. Predicted plume sizes from CSVP are similar than those predicted by the SACTI model, except for the width, which is much smaller than the widths predicted by

² This analysis uses a TD3280 data set.

SACTI. While the CSVP model does have certain limitations, such as no specified mixing height to limit maximum plume heights, it uses actual hourly meteorological data and can model “calm” hours assuming a minimum wind speed; while the SACTI model groups the meteorological data and does not process “calm” hours. Therefore, staff concludes that the CSVP modeling results, which also includes the variable load characteristics of the cooling tower with respect to variable ambient conditions, should provide more realistic visible plume characteristics.

The CSVP model predicts plume frequencies less than 10 percent of seasonal daylight “clear” hours. Therefore, no further study of the visual impacts of the cooling tower plumes have been performed (i.e. contrast, dominance, blockage).

However, the project site is aligned with a viewing point from Rock Hill to Signal Mount in Mexico. The view distance is slightly less than 40 miles. A determination of the number of hours when plumes occur and their general size distribution when the visible range is 40 miles or more has been conducted. The results of this analysis are provided in **Table 4**.

**Table 4 – Staff Predicted Hours with Dilution Water Heater Plumes and Cooling Tower Steam Plumes During Daylight High Visibility Hours
Imperial County Airport 1995-1999 Meteorological Data**

| | Available (hr) | Plume (hr) | Percent |
|----------------------|----------------|------------|---------|
| Cooling Tower Plumes | 6,349* | 218 | 3.4% |

*This is out of 40,907 hours of meteorological data with visible range data. Staff filled hours, using linear interpolation, for hours that had other data but not for hours that were completely missing from the meteorological raw data.

The relative plume sizes during the high visible range hours are provided in **Table 5**.

**Table 5 – Staff Results of High Visibility Hours Plume Dimensions
Imperial County Airport 1995-1999 Meteorological Data**

| Case | Percentile | 50% | 10% | 5% | 1% | Maximum |
|------------------------|-------------|----------|----------|----------|-----|---------|
| Dilution Water Heaters | Length (m) | 57 | 173 | 242 | 442 | 1,053 |
| | Height (m)* | 34 | 91 | 109 | 176 | 325 |
| | Width (m) | 14 | 24 | 28 | 37 | 56 |
| Cooling Tower | Length (m) | No Plume | No Plume | No Plume | 64 | 318 |
| | Height (m)* | No Plume | No Plume | No Plume | 115 | 343 |
| | Width (m) | No Plume | No Plume | No Plume | 57 | 95 |

*Statistics are based on the 6,349 daylight hours with visibility at or greater than 40 miles.

The frequency data would indicate that the cooling tower plumes would occasionally block views from Rock Hill to Signal Mount.

Water Heater Dilution Stack

Staff evaluated the applicant’s AFC (CEOE 2002a, AFC Sections 5.1.2.5.6 and 5.12.2.2.1) and Data Request Response #95 (CEOE 2002l), and performed an independent psychrometric analysis and dispersion modeling analysis. The CSVP model was used to estimate the worst-case potential plume frequency, and provide data on predicted plume length, width, and height for the dilution water heater exhausts.

Dilution Water Heater Visible Plume Modeling Analysis

Staff modeled the dilution water heater plumes using the CSVP model with a five-year (1995-1999) meteorological data set from Imperial County Airport. As can be seen in **Visual Resources Table 4** above, the dilution water heaters exhausts are basically steam (100% moisture content). The CSVP model predicted visible plumes to occur under all conditions, even the most extreme hot and dry days. **Visual Resources Table 4** provides staff's CSVP modeling analysis visible plume dimension results.

Visual Resources Table 6
Staff Results of Dilution Water Heater Visible Plume Dimensions
Imperial County Airport 1995-1999 Meteorological Data

| Case | PERCENTILE | 50% | 10% | 5% | 1% | Maximum |
|--|-------------|-----|------|------|------|---------|
| All Hours (43,824 hours) | Length (ft) | 305 | 1246 | 1633 | 2444 | 4,602 |
| | Height (ft) | 134 | 298 | 1109 | 1709 | 1066 |
| | Width (ft) | 46 | 89 | 105 | 141 | 233 |
| Daytime No Rain/No Fog (21,890 hours) | Length (ft) | 151 | 459 | 659 | 1256 | 3454 |
| | Height (ft) | 102 | 298 | 364 | 581 | 1066 |
| | Width (ft) | 39 | 72 | 85 | 115 | 184 |
| Seasonal Daytime No Rain/No Fog (9,936 hours) | Length (ft) | 216 | 607 | 863 | 1542 | 3454 |
| | Height (ft) | 131 | 354 | 462 | 689 | 1066 |
| | Width (ft) | 52 | 85 | 98 | 128 | 184 |
| Seasonal Daytime "Clear" (9,936 hours) | Length (ft) | 98 | 439 | 663 | 1355 | 3454 |
| | Height (ft) | 69 | 275 | 354 | 581 | 1066 |
| | Width (ft) | 33 | 72 | 89 | 118 | 184 |

Seasonal = November through April (day 120-304).

These results confirm that visible plume formation occurs under all conditions, with the largest plumes forming at night or early morning and during the cold weather months.

Staff has provided a visual simulation of the proposed project with a 10 percentile dilution water heater plume as they would appear to viewers at the top of Rock Hill. Staff has incorporated this simulation as **Visual Resources Figure 7**.

Because the dilution water heater plumes exceed staff's 10 percent frequency threshold for conducting a impact assessment, staff has evaluated the impact of the 10th percentile plume on viewers from KOP 4, the top of Rock Hill.

As discussed earlier, the overall sensitivity for viewers at KOP 4 is moderate to high and the visual impact of power plant structures is adverse and significant. The impacts of the dilution water plumes would be even greater than that of the project structures given their dimensions at the 10th percentile threshold (567 feet long, 298 feet high, and 75 feet wide). The plumes would highly contrast with the Cargo Muchacho Mountains and the sky. When combined with the project structures, viewer disruption from Rock Hill would be high.

CONSIDERATION OF IMPACTS IN RELATION TO CEQA SIGNIFICANCE CRITERIA

This analysis considered the potential impacts of the proposed project in relation to the four significance criteria for visual resource impacts listed in Appendix G of the CEQA Guidelines, under Aesthetics, specified below.

Would the project have a substantial adverse effect on a scenic vista?

Scenic vistas in the project region would be available from Rock Hill (about one mile to the north of the site), and the observation deck at the Salton Sea Wildlife Headquarters (approximately 500 feet to the west of the site). As discussed earlier, the Salton MEIR considers the buttes and hills to be of high scenic value and this designation out to a two mile radius. Obsidian Butte is approximately 4,000 feet to the west, however, as noted earlier, there is no public access to Obsidian Butte. In addition, the project, and the water heater dilution plumes in particular, would be prominent features in the view from Rock Hill due to the high frequency of plume occurrence and substantial size of these plumes. The resulting visual impact on vista views would be significant during cooler months.

Panoramic views are also available to nearby residents and motorists on project vicinity roads. The project would introduce additional prominent industrial structures into these panoramic landscapes and would cause a partial view disruption of higher quality visual features, resulting in an adverse and significant visual impact. Also, the project's vapor plumes would be prominent features in the panoramic views from the few nearby residences and lightly traveled project vicinity roads, due to the high frequency of occurrence and substantial size of water heater dilution stack plumes during cooler months. The resulting visual impact on local panoramic views would be adverse and significant.

Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The proposed structures are not located within the viewsheds of any state designated scenic routes. However, there is a section of SR-111 that is eligible for scenic highway status that begins about 15 miles north of the project site and continues north into Riverside County. Motorists may be able to see dilution stack plume but it would be low on the horizon and would not substantially affect the scenic vista. Therefore, project structures and plumes would not result in significant visual impacts under this criterion.

Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

As discussed in a previous section of this analysis, the proposed project would introduce additional prominent structures of industrial character into the foreground to middleground of views from a few nearby residences and sections of local roadways within approximately one mile of the proposed site. Also, the proposed project's unabated dilution plume would be a prominent and persistent feature in the views from roads and nearby residence. The resulting visual change would range from low-to-

moderate to high depending on viewpoint location. Viewers on local roads and at nearby residences would experience a substantial level of visual degradation resulting in a significant visual impact under this criterion.

Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

The project has the potential to create an additional source of substantial light that would adversely affect nighttime views in the area but, due to the low number of residences and other viewers at night, the project would result in a less than significant visual impact under this criterion.

CUMULATIVE IMPACTS

Cumulative impacts to visual resources could occur where project facilities or activities (such as construction) occupy the same field of view as other built facilities or impacted landscapes. It is also possible that a cumulative impact could occur if a viewer's perception is that the general visual quality of an area is diminished by the proliferation of visible structures (or construction effects such as disturbed vegetation), even if the new structures are not within the same field of view as the existing structures. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) visual access to scenic resources is impaired; (3) visual quality is diminished; or (4) the project's visual contrast is increased.

Staff has not identified any other planned project in the viewshed that may contribute to cumulative impacts.

As discussed in the **Setting** section of this analysis, there are nine geothermal units within a two-mile radius. Two units are within one mile of the proposed project. The project area has been altered over time by the incremental introduction of visually degrading elements until the quality and sensitivity of the views has been substantially diminished.

The County of Imperial designation for the project site and surrounding area is agricultural with a geothermal overlay (A-G-3). The SSU6 would add to the number of visible structures in the viewshed at all KOPs, particularly from KOPs 1 through 4. The proposed project would contribute to the significant cumulative visual impact that has occurred in the local area. The size of the proposed geothermal unit is substantially greater than the existing units. The addition of visually degrading elements to a view would further degrade visual quality and sensitivity of the view. The viewshed would be altered and the project would partially block the scenic vista of the mountain range in the background. The project's contribution to the cumulative visual impact would be cumulatively considerable, and thus significant, at KOPs 1, 3, and 4.

The proposed project would also contribute additional lighting impacts to a nighttime landscape that is already impacted by the lights of the existing geothermal units, thus, potentially contributing to a significant cumulative visual impact.

The dilution water heater plumes would be visible to the few residents and motorists that live or work in the local area. They would also be visible to the 12,000 to 18,000

visitors to the Refuge Headquarters and Rock Hill. Given the large dimensions of the plumes at the 10th percentile frequency threshold, the project plumes would combine with the existing plumes from the geothermal units, to cause a significant cumulative impact, particularly to those viewers at the top of Rock Hill.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is more than fifty percent (66%) within a six-mile radius of the proposed project (please refer to **Socioeconomics Figure 1** in this Staff Analysis). The Census data also shows the low income population within the same radius is less than fifty percent (18.5%).

There are a few dispersed residences within six miles. Those within two or three miles would be able to see the project structures and plumes. Those at greater distances would be able to see the plumes, particularly the dilution stack plume. The visual impacts would be significant. With full and effective implementation of the applicant's proposed mitigation measures as augmented by staff's mitigation measures and conditions of certification, the impacts experienced by local residents, including the minority population, would be reduced to levels that would not be significant. Therefore, there are no environmental justice issues related to the project.

FACILITY CLOSURE

There are at least three circumstances in which a facility closure can take place, planned closure, unexpected temporary closure and unexpected permanent closure.

Planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence. The closure plan that the project owner is required to prepare will address removal of the power plant structures.

Unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster, or an emergency. No special conditions regarding visual resources are expected to be required to address temporary closure.

Unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. The contingency plan that the project owner is required to prepare will address removal of the power plant structures.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

The L-Transmission line would run through Bureau of Land Management (BLM) managed lands and therefore should comply with BLM aesthetic objectives. The applicant has stated that the installation of the interconnection transmission line, which would connect with the IID L-Line west of SR-86, is consistent with BLM's Class IV designation for Visual Resource Management. As noted earlier in the LORS section of the setting analysis, Class IV allows activities that modify the existing character of the landscape as long as the changes are minimized to the extent possible. Staff believes that impacts have not been minimized to the extent possible since at least one of the transmission towers would directly across the street from a residence. Staff is proposing conditions of certification to reduce impacts further. With the full and complete mitigation proposed, staff agrees that the interconnection transmission line would be an appropriate activity for the Class IV designation.

STATE

There is a section of SR-111 that is eligible for scenic highway status that begins about 15 miles north of the project site and continues north into Riverside County. Motorists driving south adjacent to the Salton Sea may be able to see the steam plume from the water heater dilution stack. However, the plume would appear low on the horizon and would not degrade the visual quality of the viewshed significantly. The project is in compliance with the Caltrans Scenic Highway designation.

LOCAL

Visual Resources Table 7 provides a listing of the applicable LORS for Imperial County. Twelve LORS were found to pertain to the enhancement and/or maintenance of visual quality and the protection of views. Based on staff's analysis, it appears that the proposed project would be inconsistent with three of these LORS.

VISUAL RESOURCES Table 7
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

| LORS | | Consistency Determination Before Mitigation/ Conditions | Basis for Consistency |
|--|---|--|--|
| Source | Description of Principles, Objectives, and Policies | | |
| | | | |
| Imperial County General Plan, Land Use Element | <p><u>Goal 3</u> - Land Use Regional Vision</p> <p>Achieve balanced economic and residential growth while preserving the unique, natural, scenic, and agricultural resources of Imperial County</p> | INCONSISTENT | <p>The proposed power plant is located in an area that has an agricultural and industrial character. The regional setting includes several mountain ranges and the Salton Sea. There are nine other geothermal units in the local area, though the SSU6 would be the largest facility. The project's structures dilution stack plumes would be degrade the scenic resources of the local area such as the surrounding mountain ranges and unobstructed views of the sky. Therefore the SSU6 is considered inconsistent with this policy. Staff is proposing Conditions of Certification VIS 3, 5 and 6 which would require landscaping, elimination of the dilution stack plume, and relocation of the cooling towers. The project would then be consistent with this goal.</p> |
| Imperial County General Plan, Land Use Element | <p>Objective 3.4</p> <p>Protect and improve the aesthetics of Imperial County and its communities</p> | INCONSISTENT | <p>The project would add another industrial facility to the local area, which detracts from the rural agricultural character of the landscape. SSU6 does not improve the aesthetics of the local setting. Therefore, the project is inconsistent with this objective. Staff is proposing Condition of Certification VIS 3, 5, and 6 to make the project consistent with this objective.</p> |

VISUAL RESOURCES Table 7
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

| LORS | | Consistency Determination Before Mitigation/ Conditions | Basis for Consistency |
|---|--|--|--|
| Source | Description of Principles, Objectives, and Policies | | |
| Imperial County General Plan, Circulation and Scenic Highways Element | Objective 4.5 Develop standards for aesthetically valuable sites. Design review may be required so that structures, facilities, and activities are properly merged with the environment | CONSISTENT | The project site is not aesthetically valuable due to the presence of nine geothermal units within two miles. Therefore, the project is consistent with this objective. |
| Imperial County General Plan, Geothermal and Transmission Element | Objective 5.1 Require all major transmission lines to be located in designated corridors. | CONSISTENT | Project transmission lines are not considered major transmission lines (less than 260 kV). The interconnection lines would parallel other lines to the extent possible, use existing rights-of-way along roads, and minimize impacts on agricultural lands. The project is consistent with this objective. |
| Imperial County General Plan, Geothermal and Transmission Element | Objective 5.2 Design lines for minimum impacts on agriculture, wildlife, urban areas, and recreational activities | CONSISTENT | Project transmission structures would be treated to reduce sun reflectivity and viewer exposure. The lines would parallel existing linear features and will be located in designated transmission corridors. The lines would not have a significant affect on recreational activities because they will be routed along roads or agricultural areas. Therefore, the project is consistent with this objective. |

VISUAL RESOURCES Table 7
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

| LORS | | Consistency Determination Before Mitigation/ Conditions | Basis for Consistency |
|---|---|--|---|
| Source | Description of Principles, Objectives, and Policies | | |
| Imperial County General Plan, Geothermal and Transmission Element | Objective 5.3 Construct transmission lines in accordance with this element | CONSISTENT | Staff is proposing Condition of Certification VIS 6 to ensure he project transmission structures and lines are constructed in accordance with this element. Therefore, the project would be consistent with this objective. |
| Imperial County General Plan, Geothermal and Transmission Element | Policy G Transmission Corridors To minimize, as much as possible, the impact of transmission towers and lines upon our aesthetic environment by encouraging appropriate location and design features. | INCONSISTENT | In general, the location and design features of the transmission towers and lines minimize aesthetic impacts. However, the simulation of the transmission line at KOP 3 depicts a tower structure in close proximity to a residence on Lack Road. Therefore, the project is inconsistent with this policy. Staff is proposing Condition of Certification VIS 6 , which would require that transmission towers not be constructed in close proximity to residences. The project would then be with this policy. |

MITIGATION

APPLICANT'S PROPOSED MITIGATION MEASURES

The applicant has proposed three mitigation measures to be incorporated into the project design to minimize visual impacts associated with the operation of the facility (CEOE 2002a, pg. 3-64).

1. Project structures would be painted tan where appropriate to blend in more naturally with the brown and tan hues within the existing setting.
2. Fencing would be constructed of non-reflective materials or would be treated or painted to reduce visual effects on sensitive viewing areas, and reflectivity of surfaces would be reduced by using non-reflective elements where possible.

3. Lighting on the project site would be limited to areas required for operations or safety, will be directed onsite to avoid back-scatter, and will be shielded from public view to the extent practical. Lighting that is not required to be on during nighttime hours would be controlled with sensors or switches operated such that lighting will be on only when needed.

ADDITIONAL MITIGATION PROPOSED BY STAFF

Energy Commission staff generally agrees with the applicant's proposals. However, staff's position is that additional mitigation is needed to reduce project impacts to a less than significant level.

Power Plant

As noted in the discussion about impacts related to CEQA significance criteria, the scenic vistas from Rock Hill would be adversely and significantly impacted by the power plant structures. Staff is proposing Condition of Certification **VIS-3** which would require landscaping. In addition, staff believes that the cooling towers should be moved to the area just south of the turbine generator, which would reduce viewer disruption of Signal Mountain for visitors to Rock Hill. The cooling towers would, in effect, be screened by the power plant. Staff's proposed **Condition of Certification VIS-6** would require change in project layout.

Mitigation of Impacts of Visible Plume

As presently proposed, the project's water heater dilution plume would have an adverse and significant impact on the visual quality of the landscape for visitors to Rock Hill. The high frequency of predicted plume occurrence over the year and large sizes that would form during cooler months would cause significant visual impacts when viewed from Rock Hill. The view of Signal Mountain could be disrupted by the dilution water heater plumes and project structures for significant periods of time. For this reason, staff has concluded that plume abatement should be implemented for this project. Staff has proposed Conditions of Certification **VIS-3**, **5** and **6** to reduce the impact to less than significant by providing landscaping, installing a condensing heat exchanger, and relocating the cooling towers.

Mitigation of Project Structures and Linears

The applicant has proposed mitigation for specific project structures and linears (CEOE 2002a, pg. 14). After the geothermal brine pipelines and water pipelines are constructed, the area stripped of vegetation would be re-vegetated or returned to agricultural use. Transmission structures and conductors would be treated to reduce sun reflectivity, and new transmission lines would parallel existing linear features, to the extent practical, for most of their overall length. The construction lay-down area would be returned to agricultural use or re-vegetated.

Staff is proposing additional mitigation regarding the transmission line structures. To the extent possible, transmission towers should not be constructed in front of or in close proximity to residences. The production and injection wells should be screened to reduce visibility and related pipelines should be painted in tan hues or wrapped in non-reflective material (See Conditions of Certification **VIS-2** and **VIS-6**).

Mitigation of Impacts in Relation to CEQA Significance Criteria

As discussed previously, the proposed project would cause significant adverse visual impacts (both directly and cumulatively) with respect to Criterion 1 and 3 of the CEQA Guidelines. Effective implementation of the staff's proposed Conditions of Certification **VIS-2** and **VIS-3** would reduce these visual impacts to levels that would not be significant.

The proposed project has the potential to cause significant visual impacts with respect to each of the four CEQA significance criteria. Project structures would cause less than significant visual impacts to scenic vistas and panoramic views from local roads and nearby residences (Criterion 1). Project structures would degrade the existing character and quality of the site and its surroundings (Criterion 3). Full and timely implementation of staff's conditions of certification would reduce the visual impacts of project structures under Criteria 1 and 3 to levels that would not be significant.

The proposed project's water heater dilution stack plumes would cause significant visual impacts to scenic vistas and panoramic views from local roads and nearby residences (Criterion 1). Dilution stack plumes and cooling tower structures would also degrade the scenic quality experienced from Rock Hill (Criterion 1 and 3). Full and effective implementation of staff's previously discussed mitigation measures and Conditions of Certification **VIS-5** and **VIS-6** respectively, would reduce the visual impacts under Criteria 1 through 3 to levels that would not be significant.

The project's night lighting has the potential to create a new source of substantial light that would adversely affect nighttime views in the area and result in a significant visual impact under this criterion. However, the exterior lighting control measures proposed by the applicant and staff's proposed Condition of Certification **VIS-4** would ensure that lighting impacts would be less than significant with regard to Criterion 4.

Mitigation of Cumulative Impacts

The mitigation measures described above would reduce the project's contribution to the significant cumulative impact to a level that would not be cumulatively considerable.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that with the applicant's proposed mitigation measures and staff's proposed conditions of certification (below), the proposed project would not cause adverse and significant visual impacts. Staff also concludes that with full, effective, and timely implementation of all of staff's conditions of certification, the project would conform with all applicable laws, ordinances, regulations, and standards.

The Energy Commission should adopt the following conditions of certification if it approves the project.

PROPOSED CONDITIONS OF CERTIFICATION

VIS-1 The project owner shall ensure that visual impacts of project construction are adequately mitigated. To accomplish this, the project owner shall require the

following as a condition of contract with its contractors to construct the proposed project:

Laydown areas for linear facility construction shall be screened if they are visible from residences or adjacent roads within one-half mile. All evidence of construction activities, including ground disturbance due to staging and storage areas, shall be removed and remediated upon completion of construction to its pre-construction condition. Any vegetation removed in the course of construction will be replaced on a 1-to-1 in-kind basis. Such replacement planting shall be monitored for a period of three years to ensure survival. During this period, all dead plant material shall be replaced.

The project owner shall submit a plan to the CPM for review for screening laydown areas and restoring the surface conditions of any staging and storage areas and rights of way disturbed during construction of underground pipelines,. The plan shall include grading to the original grad, contouring and revegetation.

The project owner shall not implement the restoration plan until receiving written approval from the CPM.

Verification: At least ninety (90) days prior to beginning implementation of surface restoration of construction impacts, including construction of linear facilities, the project owner shall submit the restoration plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the restoration plan are needed before the CPM will approve the plan, within thirty (30) days of receiving that notification, the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven (7) days after completing the surface restoration that it is ready for inspection.

VIS-2 Prior to start of commercial operation, the project owner shall treat project structures, buildings, production and injection wells and related pipelines, and fences visible to the public such that: their colors minimize visual intrusion and contrast by blending with the landscape; and their surfaces do not create excessive glare. A specific treatment plan shall be developed for CPM approval to ensure that the proposed colors do not unduly contrast with the surrounding landscape colors. The plan shall be submitted sufficiently early to ensure that any precolored buildings, structures, and linear facilities will have colors approved and included in bid specifications for such buildings or structures. Prior to submittal of the plan to the CPM, the project owner shall submit the plan to Imperial County for review and comment. The submittal to the CPM should include the County's comments.

The treatment plan shall include:

- a) specifications, and 11" x 17" color simulations, of the treatment proposed for use on project structures, including structures treated during manufacture;
- b) a list of each major project structure, building, tank, and fence specifying the color(s) proposed for each item;

- c) samples of each proposed treatment and color on the materials to which they are to be applied for major structures;
- d) documentation that a non-reflective finish will be used on all project elements visible to the public;
- e) a detailed schedule for completion of the treatment; and
- f) a procedure to ensure proper treatment maintenance for the life of the project.

After approval of the plan by the CPM, the project owner shall implement the plan according to the schedule and shall ensure that the treatment is properly maintained for the life of the project. The project owner shall install tubular steel transmission line structures with a neutral gray finish. The project owner shall install non-specular conductors.

For any structures that are treated during manufacture, the project owner shall not specify the treatment of such structures to the vendors until the project owner receives notification of approval of the treatment plan by the CPM.

The project owner shall not perform the final treatment on any structures until the project owner receives notification of approval of the treatment plan from the CPM.

Verification: At least ninety (90) days prior to ordering the first structures that are color treated during manufacture, the project owner shall submit its proposed plan to the CPM for review and approval and to Imperial County for review and comment.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within thirty (30) days of receiving that notification, the project owner shall submit to the CPM a revised plan.

Not less than thirty (30) days prior to the start of commercial operation, the project owner shall notify the CPM that all structures treated during manufacture and all structures treated in the field are ready for inspection.

The project owner shall provide a status report regarding treatment maintenance in the Annual Compliance Report.

VIS-3 To screen views of the power plant from visitors to Rock Hill, trees and other vegetation consisting of informal groupings of fast-growing evergreen trees must be strategically placed and of sufficient density and height to fully screen the majority of structural forms within five (5) years after the start of commercial operation.

The project owner shall submit a landscaping plan to the CPM for review and approval and to Imperial County for review and comment. The submittal to the CPM shall include the County's comments. The Plan shall include:

- a) 11"x17" color simulations of the proposed landscaping at 5 years as viewed from KOPs 1, and 4; and

- b) a detailed list of plants to be used and times to maturity given their size and age at planting.

The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM. However, the planting must be completed by start of project operation.

Verification: Prior to start of commercial operation and at least ninety (90) days prior to installing the landscaping, the project owner shall submit the landscaping plan to the CPM for review and approval and to Imperial County for review and comment.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within thirty (30) days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven (7) days after completing installation of the landscaping, that the landscaping is ready for inspection.

VIS-4 Prior to start of commercial operation, the project owner shall design and install all lighting such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized during both project construction and operation. The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval.

The lighting plan shall include:

- a) lighting shall be designed so that during both construction and operation, highly directional, exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of this outdoor lighting shall be such that the luminescence or light source is shielded to prevent light trespass outside the project boundary;
- b) high illumination areas not occupied on a continuous basis such as maintenance platforms shall be provided with switches or motion detectors to light the area only when occupied; and
- c) a lighting complaint resolution form (following the general format of that in **Visual Resources Appendix VR-3**) shall be used by plant operators, to record all lighting complaints received and to document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file.

Verification: At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to arrange a meeting to discuss the documentation required in the lighting mitigation plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and to the Imperial County for review and comment a plan that describes the measures to be used and demonstrates that the requirements of the condition will be satisfied. The submittal to the CPM shall include

the County's comments. The project owner shall not order any exterior lighting until it receives CPM approval of the lighting mitigation plan.

At least thirty (30) days prior to start of commercial operation, the project owner shall notify the CPM that the lighting has been completed and is ready for inspection.

The project owner shall document any complaints about permanent lighting using the lighting complaint resolution form and provide a copy along with a discussion of resolution measures taken in the Annual Compliance Report for that year.

VIS-5 The project owner shall abate the water heater dilution steam plumes by incorporating a heat exchange condenser to reduce the mass flow rate of the dilution water by at least 95 percent. The water produced by the condenser shall be routed for beneficial use in the cooling towers. The remaining non-condensed dilution water heater exhaust steam may be vented to the atmosphere, if it will not cause any significant air quality impacts, otherwise it shall be combined with the non-condensed gas stream, upstream of the LO-CAT hydrogen sulfide control system.

Verification: At least sixty (60) days prior to erection of the water heater dilution stack, the project owner shall submit to the CPM for review and approval, the specifications of the heat exchange condenser and the specifications for pipelines and other equipment that will be used to ensure the elimination of the plume.

VIS-6 The project owner shall construct the cooling towers immediately south of the turbine generator building.

Verification: At least sixty (60) days prior to the start of construction, the project owner shall submit to the CPM for review and approval, the engineering drawings showing the location of the cooling towers.

If the CPM notifies the project owner that any revisions of the drawings are needed prior to CPM approval, within thirty (30) days of receiving that notification, the project owner shall submit to the CPM revised specifications.

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CEC (California Energy Commission) 2002c. Staff Data Requests 1 for 02-AFC-2. November 30, 2002.

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APPENDIX VR – 1: SUMMARY OF ANALYSIS

APPENDIX VR-2

PLUME ANALYSIS

APPENDIX VR – 3

LIGHTING COMPLAINT RESOLUTION FORM

| | |
|---|-------------|
| Salton Sea Unit 6 Project Imperial County, California | |
| Complainant's name and address: | |
| Phone number: _____ | |
| Date complaint received: _____ | |
| Time complaint received: _____ | |
| Nature of lighting complaint: | |
| Definition of problem after investigation by plant personnel: | |
| Date complainant first contacted: _____ | |
| Description of corrective measures taken: | |
| Complainant's signature: _____ | Date: _____ |
| Approximate installed cost of corrective measures: \$ _____ | |
| Date installation completed: _____ | |
| Date first letter sent to complainant: _____ (copy attached) | |
| Date final letter sent to complainant: _____ (copy attached) | |
| This information is certified to be correct: | |
| Plant Manager's Signature: _____ | |

(Attach additional pages and supporting documentation, as required.)JOKKNGCD5T723KL.VBGFRTYU

VISIBLE PLUMES APPENDIX VR-2

William Walters and Lisa Blewitt

INTRODUCTION

The following provides staff's assessment of the Salton Sea Unit 6 (SSU6) Project cooling tower and dilution water heater exhaust stack visible plumes. Staff completed a modeling analysis for the applicant's proposed unabated cooling tower design.

PROJECT DESCRIPTION

The applicant has proposed two parallel linear 10-cell conventional mechanical-draft cooling towers separated by approximately 766 feet (233 meters). The applicant has not proposed to use any methods to abate visible plumes from the cooling towers.

The proposed geothermal power process includes two dilution water heaters. The exhausts from the dilution water heaters are essentially composed of steam. These units will operate at all times when the plant is in operation.

Additionally, there will be several sources of intermittent steam plumes. These include plumes from atmospheric steam vent tanks, production test units and injection test units. These plumes will occur occasionally, forecast to occur less than 350 hours per year (SSU6, 2002b, Response 98). This analysis does not model or further evaluate these intermittent steam plume sources.

COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

EXISTING CONDITIONS

The applicant verified in Data Response (DR) #93 (SSU6 2002b) that thirteen (13) non-intermittent plume sources occur within a radius of three miles from the project site. These plume sources include Vulcan Cooling Tower and Barometric Condensers Nos. 1 and 2, Elmore Cooling Tower and Barometric Condenser, Hoch Cooling Tower and Barometric Condenser, Units 1-5 Cooling Towers, and Unit 5 Barometric Condenser. Thus, many existing facilities producing plumes are within the area of the proposed project.

The exhaust from each of the two dilution water heaters are noted to be approximately twice the relative size of any existing continuous steam plume source (SSU6 2002b, Response 93). The two project cooling towers will also be larger than any of existing cooling towers.

COOLING TOWER DESIGN PARAMETERS

Staff evaluated the applicant's AFC (SSU6 2002a, AFC Sections 5.1.2.5.6 and 5.12.2.2.1) and Data Request Responses #93-94 (SSU6 2002b), and performed an

independent psychrometric analysis and dispersion modeling analysis to predict the frequency and dimensions of visible plumes from the project's proposed unabated cooling towers.

The cooling towers design characteristics, presented below in **Table 1**, were determined through a review of the applicant's AFC and Data Request Responses, and through additional engineering calculations.

Table 1 – New Cooling Tower Operating and Exhaust Parameters

| Parameter | | New Cooling Tower Design Parameters | |
|---|-------------------|-------------------------------------|--------------------------|
| Number of Cells | | 20 (2 parallel - 1x 10 arrays) | |
| Stack Height | | 17.68 meters | |
| Cell Stack Diameter | | 9.75 meters | |
| Equivalent Stack Diameter | | 30.83 meters (10 cells) | |
| Maximum Design Inlet Air Flow Rate (kg/s) | | 17,962 (1) | |
| Tower Housing Length | | 164.0 meters | |
| Tower Housing Width | | 17.7 meters | |
| Maximum Heat Rejection Rate (MW) | | 763.6 (1) | |
| Case # (2) | Ambient Condition | Exhaust Flow Rate (lbs/s/cell) | Exhaust Temperature (°F) |
| 1 | 100°F, 25.8% RH | 1852.8 | 90.0 |
| 2 | 61°F, 48.4% RH | 1934.8 | 76.1 |
| 3 | 32°F, 81.1% RH | 1999.2 | 64.2 |

Source: AFC (SSU6 2002a, page 5.1-28), and Data Request Response #94 (SSU6 2002b, page 88).

Notes:

- (1) Cooling tower design parameters are for the two towers combined. SACTI modeling was based on one tower (381.8 MW and 8,981 kg/s air flow rate).
- (2) For CSVP modeling, values were extrapolated or interpolated between data points as necessary.

For CSVP modeling, the exhaust temperature and exhaust mass flow rate values were calculated for the hourly ambient conditions modeled through linear interpolation and extrapolation of the data provided by the applicant for the three cases presented in **Table 1**. The exhaust moisture content was determined by assuming saturated conditions at the calculated exhaust temperature.

COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

Staff modeled the cooling tower plumes using both the Combustion Stack Visible Plume (CSVP) model and the Seasonal/Annual Cooling Tower Impact (SACTI) model. The SACTI model is designed to model multiple cell cooling towers, and for the CSVP modeling analysis uses an equivalent stack diameter approach in order to model the entire exhaust water emissions of the tower. **Table 2** provides the CSVP model visible plume frequency results using a five-year (1995-1999) meteorological data set, obtained from the National Climatic Data Center, from Imperial County Airport.

**Table 2 – Staff Predicted Hours with Cooling Tower Steam Plumes
Imperial County Airport 1995-1999 Meteorological Data**

| | Available (hr) | Plume (hr) | Percent |
|--------------------------------------|----------------|------------|---------|
| All Hours | 43,824 | 4,888 | 11.15% |
| Daylight Hours | 22,217 | 743 | 3.34% |
| Nighttime Hours | 21,607 | 4,145 | 19.18% |
| Daylight No Rain/Fog Hours | 21,890 | 630 | 2.88% |
| Seasonal Daylight No Rain/Fog Hours* | 9,936 | 612 | 6.16% |
| Seasonal Daylight "Clear" Hours** | 9,936 | 287 | 2.89% |

*Seasonal conditions occur anytime from November through April.

**"Clear" hours are defined below.

These modeling results indicate that the visible plume formation would mainly occur during the cold weather months, with the majority of plume formation occurring at night or early morning. For the proposed cooling tower, the maximum temperature where a visible plume is predicted is 82°F when the relative humidity is 91%.

Staff performed an independent dispersion modeling analysis to predict the frequency and dimensions of visible plumes from the project's proposed unabated cooling towers. For the SACTI model, a single tower (10-cells) was modeled, as the two towers are separated by approximately 766 feet (233 meters). Staff's SACTI modeling analysis visible plume dimension results, for a single tower, using a five-year (1995-1999) meteorological data set from Imperial County Airport and upper air data from Tucson, AZ are provided in **Table 3**.

**Table 3 – Staff Results of Cooling Tower Visible Plume Dimensions
Imperial County Airport 1995-1999 Meteorological Data**

| Case | Model | Percentile | 50% | 10% | 5% | 1% | Maximum |
|---|-------|--------------|----------|----------|----------|---------|-----------|
| All Hours | SACTI | Length (m)** | 20-30 | 50-60 | 50-60 | 200-300 | 600-700 |
| | CSVP | | No Plume | 9 | 77 | 214 | 682 |
| | SACTI | Height (m)* | 10-20 | 40-50 | 40-50 | 60-70 | 600-700 |
| | CSVP | | No Plume | 33 | 99 | 261 | 733 |
| | SACTI | Width (m) | 20-40 | 40-60 | 40-60 | 80-100 | 400-600 |
| | CSVP | | No Plume | 40 | 55 | 66 | 86 |
| Daytime No Rain / No Fog | SACTI | Length (m)** | 10-20 | 20-30 | 40-50 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | No Plume | 50 | 357 |
| | SACTI | Height (m)* | 10-20 | 20-30 | 20-30 | 20-30 | 300-400 |
| | CSVP | | No Plume | No Plume | No Plume | 112 | 598 |
| | SACTI | Width (m) | 20-40 | 20-40 | 20-40 | 20-40 | 120-140 |
| | CSVP | | No Plume | No Plume | No Plume | 54 | 76 |
| Seasonal Daylight No Rain / No Fog | SACTI | Length (m)** | 10-20 | 20-30 | 50-60 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | 11 | 92 | 357 |
| | SACTI | Height (m)* | 10-20 | 20-30 | 20-30 | 30-40 | 300-400 |
| | CSVP | | No Plume | No Plume | 44 | 196 | 598 |
| | SACTI | Width (m) | 20-40 | 20-40 | 20-40 | 40-60 | 120-140 |
| | CSVP | | No Plume | No Plume | 44 | 61 | 76 |
| Seasonal Daytime "Clear" | SACTI | Length (m)** | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 59 | 334 |
| | SACTI | Height (m)* | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 129 | 471 |
| | SACTI | Width (m) | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 57 | 76 |

Seasonal = November through April (day 120-304).

*SACTI Plume height does not include the height (17.68 meters) of the cooling tower (release point).

**Plume length from tower. Each of the two towers are 164 meters long, so the actual plume length will also include some component of the tower length.

As **Table 3** shows, the CSVP model predicts no plumes 50 percent of the time for all cases. Additionally, the CSVP model only predicts plumes 10 percent of the time for all hours. Predicted plume sizes from CSVP are similar than those predicted by the SACTI model, except for the width which is much smaller than the widths predicted by SACTI. While the CSVP model does have certain limitations, such as no specified mixing height to limit maximum plume heights, it uses actual hourly meteorological data and can model “calm” hours assuming a minimum wind speed; while the SACTI model groups the meteorological data and does not process “calm” hours. Therefore, staff concludes that the CSVP modeling results, which also includes the variable load characteristics of the cooling tower with respect to variable ambient conditions, should provide more realistic visible plume characteristics.

The Applicant also performed a SACTI analysis, but during the course of resolving data response issues regarding inconsistent exhaust flow data presented in Data Response 94 and their SACTI input files, they have informed staff that the values in Data Response 94 are correct. Therefore, the Applicant’s SACTI modeling analysis does not use correct input data and is not considered valid.

Visual observation of the existing cooling towers indicates a higher than anticipated frequency of visible plumes. In particular, during a site visit on November 21, 2002, plumes were observed from some of the existing cooling towers when the ambient conditions were 81°F and 17% relative humidity. Staff is concerned that the use of the steam condensate as the cooling tower circulating water source, and/or that the addition of the noncondensable gas stream, may create conditions that cause these unexpected visible plumes. Staff requested that the Applicant provide design parameters for the existing cooling towers in order to determine if there was a reason for the observed unexpected visible cooling tower plumes. The Applicant’s data indicated that existing cooling towers had a wide range of design conditions. In particular the air flow rate per megawatt of heat rejection varies greatly, as does the drift fraction. The observed plumes were from the cooling towers with low air flow rates per megawatt of heat rejection (such as the Unit 3 and Unit 5 cooling towers), while the cooling towers with the higher air flow rates either did not have visible plumes or had extremely faint plumes (such as the Vulcan or Elmore cooling towers). The SSU6 cooling tower is being designed to have a high air flow rate and a very low drift fraction, so it should perform like the existing towers with similar operating variables. However, with the available data staff cannot conclude that the use of the steam condensate, or the addition of the non-condensable gases, will not cause the visible plume frequency of the SSU6 cooling tower to be higher than modeled.

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 10% of seasonal (November through April) daylight no rain/fog high visual contrast (i.e. “clear”) hours analysis is used to determine potential plume impact significance. The high visual contrast hours analysis methodology is provided below:

The Energy Commission has identified a “clear” sky category during which plumes have the greatest potential to cause adverse visual impacts. For this project the meteorological data

set¹ used in the analysis categorizes total sky cover and opaque sky cover in six categories. Staff has included in the “Clear” category a) all hours with total sky cover categorized as clear b) half of the hours with sky cover categorized as scattered or broken. Hours with total sky cover categorized as overcast, partially obscured or obscured were not considered “clear” hours. The rationale for including these three sky cover categories is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10%, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-100% and the opacity of sky cover is relatively low (equal to or less than 50%), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria can be considered high visual contrast hours and are included in the “clear” sky definition.

The CSVP model predicts plume frequencies less than 10% of seasonal daylight “clear” hours. Therefore no additional study of the general visual impacts of the cooling tower plume have been performed. However, staff does have a concern regarding one viewpoint, from Rock Hill to Signal Mount, that has been evaluated separately.

DILUTION WATER HEATER VISIBLE PLUME MODELING ANALYSIS

Staff evaluated the applicant’s AFC (SSU6 2002a, AFC Sections 5.1.2.5.6 and 5.12.2.2.1) and Data Request Response #95 (SSU6 2002b), and performed an independent psychrometric analysis and dispersion modeling analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency, and provide data on predicted plume length, width, and height for the dilution water heater exhausts.

DILUTION WATER HEATER DESIGN PARAMETERS

Based on the stack exhaust parameters anticipated by the applicant for the dilution water heaters, the frequency and size of visual plumes can be estimated. The operating data for the dilution water heaters are provided in **Table 4**.

Table 4 – Dilution Water Heater Exhaust Parameters

| Parameter | Dilution Water Heater Exhaust Parameters | | |
|-----------------------------|--|----------------|----------------|
| Stack Height | 13.72 meters (45 feet) | | |
| Stack Diameter | 2.44 meters (8 feet) | | |
| | Case 1 | Case 2 | Case 3 |
| Ambient Temp | 100°F | 61°F | 32°F |
| Ambient Relative Humidity | 25.8% | 48.4% | 81.1% |
| Exhaust Temperature | 212.9°F | 212.9°F | 212.9°F |
| Exit Velocity | Calculated for each hour modeled | | |
| Exhaust mass flow rate | 204,291 lbs/hr | 204,291 lbs/hr | 204,291 lbs/hr |
| Exhaust Molecular Weight | 18.0 lbs/lb-mol | | |
| Moisture Content (% by wt.) | 100% | 100% | 100% |

Source: AFC (SSU6 2002a), page 5.1-28, and Data Request Response #95 (SSU6 2002b, page 88).

¹ This analysis uses a TD3280 data set.

DILUTION WATER HEATER VISIBLE PLUME MODELING ANALYSIS

Staff modeled the dilution water heater plumes using the CSVP model with a five-year (1995-1999) meteorological data set from Imperial County Airport. As can be seen in **Table 4** above, the dilution water heaters exhausts are basically steam (100% moisture content). The CSVP model predicted visible plumes to occur under all conditions, even the most extreme hot and dry days. **Table 5** provides Staff's CSVP modeling analysis visible plume dimension results.

**Table 5 – Staff Results of Dilution Water Heater Visible Plume Dimensions
Imperial County Airport 1995-1999 Meteorological Data**

| Case | Percentile | 50% | 10% | 5% | 1% | Maximum |
|---|-------------|-----|-----|-----|-----|---------|
| All Hours (43,824 hours) | Length (m) | 93 | 380 | 498 | 745 | 1,403 |
| | Height (m)* | 41 | 91 | 103 | 159 | 325 |
| | Width (m) | 14 | 27 | 32 | 43 | 71 |
| Daytime No Rain/No Fog (21,890 hours) | Length (m) | 46 | 140 | 201 | 383 | 1,053 |
| | Height (m)* | 31 | 91 | 111 | 177 | 325 |
| | Width (m) | 12 | 22 | 26 | 35 | 56 |
| Seasonal Daytime No Rain/No Fog (9,936 hours) | Length (m) | 66 | 185 | 263 | 470 | 1,053 |
| | Height (m)* | 40 | 108 | 141 | 210 | 325 |
| | Width (m) | 16 | 26 | 30 | 39 | 56 |
| Seasonal Daytime "Clear" (9,936 hours) | Length (m) | 30 | 134 | 202 | 413 | 1,053 |
| | Height (m)* | 21 | 84 | 108 | 177 | 325 |
| | Width (m) | 10 | 22 | 27 | 36 | 56 |

Seasonal = November through April (day 120-304).

These results confirm that visible plume formation occurs under all conditions, with the largest plumes forming at night or early morning and during the cold weather months. The CSVP model predicts plume frequencies greater than 10% of seasonal daylight no rain/fog high visual contrast hours, which would trigger a study of the visual impacts of the plume from the dilution water heaters. The visual impact analysis for the dilution water heater plumes is provided in the Visual Resources section of the Staff Assessment.

SIGNAL MOUNT VIEW IMPAIRMENT ANALYSIS

The project site is aligned with a viewing point from Rock Hill to Signal Mount in Mexico. The view distance is slightly less than 40 miles. A determination of the number of hours when plumes occur and their general size distribution when the visible range is 40 miles or more has been conducted. The results of this analysis are provided in **Table 6**.

**Table 6 – Staff Predicted Hours with Dilution Water Heater Plumes
and Cooling Tower Steam Plumes During Daylight High Visibility Hours
Imperial County Airport 1995-1999 Meteorological Data**

| | Available (hr) | Plume (hr) | Percent |
|----------------------|----------------|------------|---------|
| Cooling Tower Plumes | 6,349* | 218 | 3.4% |

*This is out of 40,907 hours of meteorological data with visible range data. Staff filled hours, using linear interpolation, for hours that had other data but not for hours that were completely missing from the meteorological raw data.

As noted earlier the dilution water heaters exhausts are essentially steam exhausts that will be visible under all conditions. The relative plume sizes during the high visible range hours are provided in **Table 7**.

**Table 7 – Staff Results of High Visibility Hours Plume Dimensions
Imperial County Airport 1995-1999 Meteorological Data**

| Case | Percentile | 50% | 10% | 5% | 1% | Maximum |
|------------------------|-------------|----------|----------|----------|-----|---------|
| Dilution Water Heaters | Length (m) | 57 | 173 | 242 | 442 | 1,053 |
| | Height (m)* | 34 | 91 | 109 | 176 | 325 |
| | Width (m) | 14 | 24 | 28 | 37 | 56 |
| Cooling Tower | Length (m) | No Plume | No Plume | No Plume | 64 | 318 |
| | Height (m)* | No Plume | No Plume | No Plume | 115 | 343 |
| | Width (m) | No Plume | No Plume | No Plume | 57 | 95 |

*Statistics are based on the 6,349 daylight hours with visibility at or greater than 40 miles.

The frequency data would indicate that the cooling tower plumes would only occasionally be able to block views from Rock Hill to Signal Mount. However, this report makes no attempt to determine the quantity or significance of view blockage from Rock Hill to Signal Mount. The information provided here will be analyzed further in the Visual Resources section of the Staff Assessment.

REFERENCES

SSU6 (Salton Sea Unit 6) 2002a. Application for Certification, Volumes 1 and 2 (02-AFC-2). Submitted to the California Energy Commission on July 26, 2002.

SSU6 (Salton Sea Unit 6) 2002b. Data Request Response Set 1. December 2, 2002.

WASTE MANAGEMENT

Ellen Townsend-Hough

INTRODUCTION

This Preliminary Staff Assessment presents an analysis of issues associated with managing wastes generated from constructing and operating the proposed Salton Sea Unit 6 Project (SSU6). Staff evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. The technical scope of this analysis encompasses wastes generated during facility construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's objectives in its waste management analysis are to ensure that:

- The management of the wastes will be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project will be managed in an environmentally safe manner; and
- The disposal of project wastes will not result in significant adverse impacts to existing waste disposal facilities.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

Resource Conservation and Recovery Act (42 U.S.C. § 6922)

RCRA establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding:

- Record keeping practices which identify quantities of hazardous wastes generated and their disposition,
- Labeling practices and use of appropriate containers,
- Use of a manifest system for transportation, and
- Submission of periodic reports to the U.S. Environmental Protection Agency (EPA) or authorized state.

Title 40, Code of Federal Regulations, part 260

These sections contain regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity; and specific types of wastes are listed.

STATE

California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended).

This act creates the framework under which hazardous wastes must be managed in California. It mandates the State Department of Health Services (now the Department of Toxic Substances Control (DTSC) under the California Environmental Protection Agency, or Cal EPA) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal EPA and creates a manifest system to be used when transporting such wastes.

Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal)

These regulations set forth-minimum standards for solid waste handling and disposal; guidelines to ensure conformance of solid waste facilities with county solid waste management plans, as well as enforcement and administration provisions.

Title 22, California Code of Regulations, §66262.10 et seq. (Generator Standards)

These sections establish requirements for generators of hazardous waste. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the federal program, hazardous waste generators must obtain EPA identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous waste must only be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established.

Title 22, California Code of Regulations, §67100.1 et seq. (Hazardous Waste Source Reduction and Management Review)

These sections establish reporting requirements for generators of certain hazardous and extremely hazardous wastes in excess of specified limits. The required reports must indicate the generator's waste management plans and performance over the reporting period.

LOCAL

The Imperial County Department of Public Health, Environmental Services Division has the responsibility for administration and enforcement of the California Integrated Waste Management Act for non-hazardous solid waste at the proposed SSU6. Local agencies are responsible for the administration and enforcement of the hazardous material laws. The Imperial County Department of Public Health, Environmental Health Services Division and the Imperial county Fire Protection Department will regulate hazardous waste at SSU6.

The Imperial County Fire Prevention Department is responsible for enforcement of the Uniform Fire Code, Article 80, which requires that a Hazardous Materials Inventory Statement and a Hazardous Materials Management Plan be prepared. This is discussed in greater detail in the **Hazardous Materials Management** section.

SETTING

PROJECT AND SITE DESCRIPTION

The proposed project is located on 80 acres of a 160-acre parcel in Imperial County. The plant is located north of McKendry Road, west of Severe Road, south of Peterson Road and east of Boyle Road. The area is primarily surrounded by agriculture. The proposed SSU6 would be located on the project site owned by CE Obsidian Energy (CEOE 2002a, Section 1.2).

The proposed SSU6 would be a 185-megawatt geothermal power plant. The components of this power plant would consist of a geothermal Resource Production Facility, a merchant class geothermal-powered Power Generation Facility and associated facilities (CEOE 2002a, p. 3-1).

The applicant completed and submitted a Phase I Environmental Site Assessment (ESA) conducted according to American Society for Testing and Materials (ASTM) standards. URS completed the ESA on January 29, 2002. Historical aerial photography shows the project site has been used for agriculture since 1953. The Phase I ESA performed for the power plant identified potential areas of concern, including various concrete slabs, existing geothermal wells, and potential pesticide and herbicide contamination, and recommended that an additional evaluation may need to be performed (CEOE 2002a, Appendix O). The applicant has noted that given the proposed industrial development on the site, neither a Phase II ESA nor remediation would be required (CEOE 2002a, p. 5.13-2). The applicant's consultant reviewed over twenty national and state databases through the Vista Site Assessment Plus Report for the evaluation of the proposed project site. The proposed project site is not listed in the Vista Site Assessment Plus Report (CEOE 2002a, Appendix O). Staff is currently consulting with the Department of Toxic Substances Control (DTSC) regarding the adequacy of the ESA performed to date as well as any further investigations that DTSC may deem necessary. DTSC's comments and recommendations, including any that may concern management of hazardous wastes generated during facility construction and operation will be addressed in the Final Staff Assessment.

PROJECT SPECIFIC IMPACTS

Staff routinely coordinates its analysis of potential hazardous waste issues and compliance with LORS with The California Department of Toxic Substances Control (DTSC). DTSC concurred with the statements in the AFC and commented that additional evaluation of the site may be necessary to determine if hazardous chemical spills have impacted the site. Based upon DTSC's comments, staff is requesting additional information from the applicant regarding potential impacts on the site from any such hazardous chemical releases.

CONSTRUCTION

Site preparation and construction of the proposed SSU6 and associated facilities would generate both nonhazardous and hazardous wastes in solid and liquid forms.

Nonhazardous Solid Wastes

Anticipated nonhazardous solid wastes generated during construction are detailed in Section 5.13.2.1.1 of the AFC (CEOE 2002a). Approximately 25 to 40 cubic yards per week of scrap wood, paper, glass and plastics, scrap metal and insulation could be generated during project construction (CEOE 2002a, Table 5.13-1). Wherever possible and practical, these wastes would be recycled. Nonrecyclable wastes would be collected and disposed of in a Class III landfill.

WASTE MANAGEMENT TABLE 1
Anticipated Nonhazardous Construction Waste

| Waste | Anticipated Waste Stream Classification | Estimated Quantity | Estimated Frequency of Generation |
|--|---|----------------------------|-----------------------------------|
| Scrap wood, steel, glass, plastic, paper, calcium silicate insulation, mineral wood insulation | Non-hazardous | 25-40 cu yd | Weekly |
| Oil absorbent materials | Nonhazardous | Small Quantities | As Needed |
| Oily rags generated during normal construction activities, lube oil flushes | Nonhazardous | 3-4 55 gallon drums | Monthly |
| Drilling Waste | Nonhazardous | 300,00 –700,000 cubic feet | During Construction |

During the construction of production and injection wells, drilling waste will be removed from the ground. The drilling wastes consist of soils, brine effluent and other materials. This waste would dry out in Regional Water Quality Control Board permitted, clay-lined mud sumps. Before disposal, the remaining solid waste would be tested to confirm if the waste is hazardous. Waste that is determined to be non-hazardous would be disposed of in Desert Valley company's Monofill Facility, a Class II landfill. Any waste that is deemed hazardous would be disposed of in a Class I landfill (CEOE 2002a, Table 5.13-1).

Nonhazardous Liquid Wastes

Nonhazardous liquid wastes would be generated during construction including sanitary wastes, equipment washwater, stormwater runoff, and wastewater from the gas pipeline hydrotesting process. If excavation dewatering occurs, additional nonhazardous wastewater would be generated.

Sanitary waste would be collected in portable toilet facilities and serviced by an outside contractor. Equipment wash-water would be contained at the designated wash sites and disposed of offsite. If the equipment wastewater contains free-phase

hydrocarbons, it will be run through an oily water separator. Oil removed from the separator will be disposed offsite. Storm-water runoff would be managed according to an approved plan developed by the construction contractor and is discussed in more detail in the **Soil and Water Resources** section of this document.

The wastewater produced from the natural gas pipeline and metering station would include sanitary waste and wastewater from pressure testing the gas supply line after construction. Water that is not contaminated would be discharged to an Imperial Irrigation District (IID) drain canal (CEOE 2002, p. 5.13-5). Contaminated water would be disposed of at a liquid disposal facility.

Hazardous Wastes

Hazardous wastes anticipated to be generated during construction are discussed in Section 5.13.2.1.1 of the AFC (CEOE 2002a). Solid hazardous wastes may include empty hazardous material containers, used and waste lube oil during steam turbine lube oil flushes, spent lead acid batteries and spent alkaline batteries (CEOE 2002a, Table 5.13-1). Wherever possible, the treatment method of choice for these wastes would be recycling at a permitted facility. The cleaning and flushing liquids would be sampled and characterized, and disposed of accordingly. Any non-recyclable hazardous wastes would be properly disposed of in one of three permitted Class I landfills discussed in Section 5.13.2.2 of the AFC.

The construction contractor will be considered the generator of hazardous wastes at the SSU6, and therefore responsible for compliance with all applicable LORS regarding these wastes, including employee training, accumulation limits, record keeping, and reporting. The accumulated wastes would be removed from the site and transported by a certified collection company to a permitted transfer, storage and disposal (TSD) facility prior to the expiration of the 90-day limit (CEOE 2002a, p. 5.13-6).

OPERATION

The proposed SSU6 would generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions. Filter-cake consisting of brine solids from the dewatering process will be the primary waste generated.

Nonhazardous Solid Wastes

The proposed project will generate 120 tons per day of filter-cake wastes. The filter-cakes solids are extracted from the geothermal brine fluid. Also, 2.5 tons per day of solid waste, the majority of which would be elemental sulfur, would come from the H₂S abatement system. Both the filter-cake and the H₂S abatement waste would be tested for hazardous substances and, if found to be hazardous, would be disposed of in a Class I landfill (CEOE 2002a, p. 5.13-6).

Other nonhazardous solid wastes generated during plant operation are expected to include rags, turbine air filters, machine parts, electrical materials, empty containers, and typical worker and small office wastes. Approximately 20 cubic yards of these wastes are projected to be generated annually (CEOE 2002a, Table 5.13-3).

Nonhazardous Liquid Wastes

The wastewater from the clarifier effluent and cooling water blowdown would be discharged to injection wells for disposal and replenishment of the geothermal resource. Storm water from chemical storage, feed areas, reverse osmosis (RO) reject water, and oxygenated brine effluent in the clarifier would go the brine pond before being discharged to a dedicated injection well (CEOE 2002a, p. 5.13-7). The remaining liquid wastes are cooling tower wash-down and blow-down, chemical feed area drainage, and general plant drainage. Liquid wastes are discussed in more detail in the **Soil and Water Resources** section of this document.

Hazardous Wastes

Hazardous wastes anticipated to be generated during routine project operation include waste lubricating oil, used oil filters, laboratory waste, oily rags and absorbents, and used acidic and alkaline chemical cleaning wastes (potentially containing high concentrations of heavy metals). Table 5.13-3 in the AFC lists the anticipated hazardous wastes along with their origin, composition, estimated quantity, hazard class, and disposal method. Most of the wastes would be generated in relatively small quantities and would be recycled by certified recyclers. Acidic and alkaline cleaning wastes would be disposed of offsite.

The brine pond solids would constitute the largest percentage of waste at approximately 16,700 tons per year (CEOE 2002a p. 5.13-8). Brine pond solids and scale found in pipes, clarifiers, and separators during maintenance shutdowns will be disposed of as hazardous waste in a Class I landfill. The drilling waste and H₂S abatement waste will be tested and, if found hazardous, would be disposed of in a Class I landfill.

IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

Nonhazardous and hazardous waste disposal sites suitable for disposal of project-related construction and operation wastes are identified in Table 5.13-2 of the AFC (CEOE 2002a). Listed in **WASTE TABLE 2** are the largest waste streams anticipated to be disposed of by the proposed project.

WASTE MANAGEMENT Table 2
Summary of the Largest Waste Streams

| Waste Stream | Waste Stream Classification | Estimated Quantity | Estimated Frequency of Generation | Offsite Treatment |
|---|------------------------------------|---------------------------|--|-----------------------------|
| (1) Wood, steel, glass paper, plastic, insulation | Non-hazardous | 25-40 cu yards | Weekly during construction | Class III disposal facility |
| (2) Drilling Waste* | Non-hazardous | 300,00-700,000 cu feet | During construction | Class II Monofill Landfill |
| (3) Sulfur byproduct* | Non-hazardous | 2.5 tons | Daily during operation | Class II disposal facility |
| (4) Filter-cake* | Non-hazardous | 120 tons | Daily during operation | Class II disposal facility |
| (5) Brine Pond Solids | Hazardous | 16,700 tons | Yearly during operation | Class I disposal facility |

* Items (2), (3) and (4) will be tested to verify if the waste is hazardous before disposal.

The minimal amounts of nonhazardous waste, which would be generated from the proposed project on the order of 25 -40 cubic yards per week during construction, will be disposed of in a Class III waste disposal site. On page 5.13-15 of the AFC, the applicant list four landfills that can be used for disposal of the proposed project's solid waste. The sites have permitted capacity from 5.1 tons per day to 22 tons per day. Thus, the total amount of nonhazardous waste generated from project construction and operation will use only a small fraction of the available Class III landfills' capacity. Staff concludes that this potential impact will be less than significant. The majority of nonhazardous waste from the proposed SSU6 project will be disposed of in a Class II landfill.

The non-hazardous drilling wastes, sulfur byproducts, and filter-cake will be disposed of in the Class II Monofill Facility. In September 2003, a new cell will be permitted to begin operation. The cell is permitted to accept 510 tons per day of solid waste. The cell will operate until 2012; therefore there is no short-term capacity problem for disposal of the project-related wastes. SSU6 is expected to operate beyond 2012; therefore, sulfur byproducts and filter cake will continue to be generated. The Monofill Facility has already permitted 160 acres of land for landfill use and will continue to add landfill capacity as needed (CEOE 2002a, p. 5.13-7). If additional capacity is not constructed at the Monofill Facility beyond 2012, the waste could be disposed of in a Class I landfill (CEOE 2002a, p. 5.13-7).

The AFC lists three Class I landfills in California that are permitted to accept hazardous waste: at Chemical Waste Management in King's County, Buttonwillow in Kern County, and Westmoreland in Imperial County (CEOE 2002a, Table 5.13-2). In total, there is an excess of 21.9 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with remaining operating lifetimes up to the year 2078. The amount of hazardous waste transported to these landfills has decreased in recent years due to source reduction efforts by generators, and the transport of waste out of state that is hazardous under California law, but not federal law.

Empty hazardous material containers, used and waste lube oil, spent lead batteries, spent alkaline batteries and hydraulic fluids are some of the hazardous waste that will be recycled (CEOE 2002a, Table 5.13-1 and Table 5.13-3). The volume of hazardous waste from SSU6 requiring off-site disposal would be a very small fraction (less than 0.01 percent) of the existing combined capacity of the three Class I landfills, and would not significantly impact the capacity or remaining life of any of these facilities.

CUMULATIVE IMPACTS

As proposed, the quantities of nonhazardous and hazardous waste generated during construction and operation of the SSU6 would add to the total quantities of waste generated in Imperial County and the State of California. However, because (a) the waste would be generated in small quantities, (b) recycling efforts would be prioritized wherever practical, and (c) capacity is available in a variety of disposal facilities, these added quantities would not result in significant waste management impacts to any hazardous or nonhazardous landfill.

One hundred and twenty-three tons per day of filter-cake and sulfur wastes would be produced at SSU6 until approximately 2035. The Monofill Facility is scheduled to be in operation until 2012. As mentioned above, the Monofill Facility has obtained 160 acres of land permitted for a landfill. If the class II facility is not available to accept the waste from SSU6, disposal at a Class I landfill will be a feasible option.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed SSU6 (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. As noted earlier, staff is still awaiting additional information from the applicant. Therefore, we cannot at this time conclude that there would be no significant direct or cumulative waste-related impacts resulting from construction and operation of the proposed facility. Therefore, we are also unable to determine if there are environmental justice issues.

FACILITY CLOSURE

Sections 3.6, 5.13.2.4, and 5.13.2.4 of the AFC discusses SSU6's responsibilities for waste management in the event of a temporary facility closure due to damage to the facility due to a natural disaster or permanent closure due to a cessation of operations. The applicant indicates that a contingency plan for temporary closure will be prepared prior to facility startup. In addition, a Risk Management Plan (CEOE 2002a, § 5.14.2.2) will be established containing additional procedures to be followed in the event of temporary closure due to plant damage or the possible release of a hazardous waste or material into the environment.

During any type of facility closure (see staff's **General Conditions** section which discusses planned, unexpected temporary, and unexpected permanent closure), the primary waste management related concern is that project wastes not pose any

potentially significant problem to the public, workers, or the environment. Staff believes that conditions of certification in the General Conditions section would adequately address waste management issues related to closure.

In the case of unexpected temporary closure, waste management practices normally required by LORS and already in-place (such as limiting hazardous waste accumulation time to 90 days and requiring proper containment) would be adequate to avoid significant problems. In addition, staff's General Conditions for Facility Closure require preparation of an on-site contingency plan, which shall provide for removal of hazardous wastes and draining of all chemicals from storage tanks and other equipment for temporary closures exceeding 90 days.

An approved on-site contingency plan is also required to protect public health and safety in the case of unexpected permanent closure. As stated above, the plan must provide for the removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment.

For planned permanent closure, SSU6 would develop a facility General Closure Plan at least twelve months prior to commencement of closure and is committed to complying with LORS that are applicable at the time of closure. The applicant indicates (CEOE 2002a, § 5.13.2.5) that such a closure plan would emphasize the maximum recycling of facility components and 24-hour site security.

MITIGATION

AFC section 5.13.2.1 states that the handling and management of wastes at the proposed SSU6 facility would follow the hierarchical approach described in the following order of preference from greatest to least:

1. Source reduction through pollution prevention measures,
2. Recycling or reusing waste materials,
3. Treatment to render the waste nonhazardous such as through neutralization, and
4. Disposal of only those wastes that cannot be reduced treated or recycled.

Sections 5.13.2 of the AFC discuss waste management measures, such as SSU6 would employ during the construction and operation phases to manage and mitigate the impacts of the generation of liquid and solid non-hazardous and hazardous wastes.

Staff has proposed Conditions of Certification **WASTE-1, 2, 3, 4, and 5** which require that: 1) the project owner have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered; 2) if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling, file a written report, and seek guidance from the CPM and the appropriate regulatory agencies; 3) the project owner obtain a unique hazardous waste generator identification number from the Department of Toxic Substances Control

(DTSC) in accordance with DTSC regulatory authority; 4) the project owner notify the CEC Compliance Project Manager whenever the owner becomes aware of any impending waste management-related enforcement action; and 5) the project owner prepare and submit waste management plans for all wastes generated during construction and operation of the facility and submit them to the CPM and the local agency.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the California Department of Toxic Substances Control (DTSC). Because hazardous wastes would be produced during project construction and operation, both the SSU6 and its construction contractor would be required to obtain hazardous waste generator identification numbers from the DTSC. Accordingly, both SSU6 and its construction contractor would be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records and appropriately train their employees. Pursuant to California Code of Regulations, Title 22, section 67100.1 et seq., a hazardous waste Source Reduction and Evaluation Review and Plan must be prepared by the SSU6 if certain threshold quantities of hazardous wastes are generated on an annual basis.

Until comments are received from DTSC regarding the management of hazardous wastes however, staff cannot make its final determination regarding potential hazardous waste-related environmental impacts or compliance with LORS.

CONCLUSIONS AND RECOMMENDATIONS

Staff solicited and received comments from DTSC regarding the management of hazardous wastes from SSU6. DTSC concurred with the findings of the AFC and commented that additional evaluation of the site may be necessary to determine if hazardous chemical spills have impacted the site. Based on DTSC's comments, staff is requesting additional clarifying information from the applicant regarding the potential impact on the site of any such hazardous chemical releases. Thus, staff cannot make its final determination regarding potential hazardous waste-related environmental impacts or compliance with LORS without additional clarifying information from the applicant.

CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who shall be available for consultation during soil excavation and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The Registered Professional Engineer or Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit the resume to the CPM for approval.

WASTE-2 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner and CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Registered Professional Engineer or Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact (as appropriate) representatives of the Regional Water Quality Control Board, the Imperial County Fire Prevention Department, and the California Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Registered Professional Engineer or Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste.

Verification: The project owner shall keep its copy of the identification number on file at the project site and notify the CPM via the Monthly Compliance Report of its receipt.

WASTE-4 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

WASTE-5 The project owner shall prepare a Construction Waste Management Plan and an Operation Waste Management Plan for all wastes generated during construction and operation of the facility, respectively, and shall submit both

plans to the CPM for review and approval. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: No less than 30 days prior to the start of site mobilization, the project owner shall submit the Construction Waste Management Plan to the CPM. The Operation Waste Management Plan shall be submitted to the CPM no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions within 20 days of notification by the CPM.

In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to the planned management methods.

REFERENCES

CE Obsidian Energy, LLC (CEOE) 2002a. Application for Certification for Salton Sea Unit 6, Geothermal Power Plant Project Volume I & 2. July 26, 2002.

WORKER SAFETY AND FIRE PROTECTION

Geoff Lesh and Rick Tyler

INTRODUCTION

This section of the staff assessment provides staff's evaluation of the Salton Sea Unit 6 project's compliance with laws, ordinances, regulations, and standards (LORS) relating to worker safety and fire protection. A framework for worker safety and fire protection is provided by LORS, and enforced through regulations codified at the Federal, State, and local levels. Worker safety is of utmost priority at the project location and is documented through worker safety practices and training. Industrial workers at the facility operate process equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to either eliminate these hazards or minimize the risk through special training, protective equipment or procedural controls. The purpose of this analysis is to assess whether the worker safety and fire protection measures proposed by CE Obsidian Energy LLC (CEOE or applicant) for the Salton Sea Unit 6 Project (SSU6) are adequate to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

In December 1970 Congress enacted Public Law 91-596, the Federal Occupational Safety and Health Act of 1970 (OSH Act). This Act mandates safety requirements in the workplace and is found in Title 29 of the United States Code, section 651 through 678 (29 U.S.C. §§ 651-678). Implementing regulations are codified at Title 29 of the Code of Federal Regulations, under General Industry Standards sections 1910.1 through 1910.1500. These clearly define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector. Most of the general industry safety and health standards now in force under this OSH Act represent a compilation of materials from existing federal standards and national consensus standards. These include standards from voluntary membership organizations of the American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA) which publishes the National Fire Codes.

The purpose of the Occupational Safety and Health Act is to "assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources," (29 U.S.C. § 651). The Federal Department of Labor promulgates and enforces safety and health standards that are applicable to all businesses affecting interstate commerce. The Department of Labor established the

Occupational Safety and Health Administration (OSHA) in 1971 to discharge the responsibilities assigned by the OSH Act.

Applicable Federal requirements include:

- Occupational Safety and Health Act of 1970 29 U.S.C. § 651 et seq.;
- Occupational Safety and Health Administration Safety and Health Regulations 29 C.F.R. §1910.1 - 1910.1500;
- Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 C.F.R. §§1910.1 – 1910.1500 and §§ 1952.170 – 1952.175.

STATE

California passed the Occupational Safety and Health Act of 1973 ("Cal/OSHA"), codified in California Labor Code § 6300 et seq. Regulations promulgated as a result of the Act are codified at Title 8 of the California Code of Regulations, beginning with sections 337-560 and continuing with sections 1514 through 8568. The California Labor Code requires that the Cal/OSHA Standards Board adopt standards at least as effective as the federal standards (Labor Code § 142.3(a)). Thus all Cal/OSHA health and safety standards meet or exceed the Federal requirements. California obtained federal approval of its State health and safety regulations, in lieu of the federal requirements which are codified at 29 CFR §1910.1 - 1910.1500. The Federal Secretary of Labor, however, continually oversees California's program and will enforce any federal standard for which the State has not adopted a Cal/OSHA counterpart.

Employers are responsible for informing their employees about workplace hazards, potential exposure and the work environment (Labor Code § 6408). Cal/OSHA's principal tool in ensuring that workers and the public are informed is the Hazard Communication standard first adopted in 1981. Cal. Code Regs., tit. 8, §5194. This regulation was promulgated in response to California's Hazardous Substances Information and Training Act of 1980. It was later revised to mirror the Federal Hazard Communication Standard (29 C.F.R. §1910.1200) which established on the federal level an employee's "right to know" about chemical hazards in the workplace, but added the provision of applicability to public sector employers. A major component of this regulation is the required provision of Material Safety Data Sheets (MSDS's) to workers. MSDS's provide information on the identity, toxicity, and precautions to take when using or handling hazardous materials in the workplace.

Finally, California Code of Regulations, Title 8 section 3203 requires that employers establish and maintain a written Injury and Illness Prevent Program to identify workplace hazards and communicate them to its employees through a formal employee-training program.

Applicable State requirements include:

- Cal. Code Regs., tit. 8, §339 - List of hazardous chemicals relating to the Hazardous Substance Information and Training Act;

- Cal. Code Regs., tit. 8, §339 - List of hazardous chemicals relating to the Hazardous Substance Information and Training Act;
- Cal. Code Regs., tit. 8, §337, et seq. Cal/OSHA regulations;
- Cal. Code Regs., tit. 24, § 3 et seq. - incorporates the current addition of the Uniform Building Code;
- Health and Safety Code § 25500 et seq. - Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at the facility;
- Health and Safety Code §§ 25500 - 25541 - Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at the facility.

LOCAL

The California Building Standards Code published at Title 24 of the California Code of Regulations section 3 et seq. is comprised of eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The Building Standards Code includes the electrical, mechanical, energy, and fire codes applicable to the project. Local planning/building and safety departments enforce the California Uniform Building Code.

National Fire Protection Association (NFPA) standards are published in the California Fire Code. The fire code contains general provisions for fire safety, including but not restricted to: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistive construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code reflects the body of regulations published at Cal. Code Regs., 24 (Health and Safety Code §18901 et seq.) pertaining to the California Fire Code.

Similarly, the Uniform Fire Code (UFC) Standards, a companion publication to the California Fire Code, contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition.

Applicable local (or locally enforced) requirements include:

- 1998 Edition of California Fire Code and all applicable NFPA standards (Title 24, California Code of Regulations, sections 901-907);
- California Building Code Title 24, California Code of Regulations, section 3 et seq.
- Uniform Fire Code, 1997

SETTING

The SSU6 site is in the Imperial Valley, southeast of the Salton Sea. The Imperial Valley is the southwest part of the Colorado Desert that merges northwestward into the Coachella Valley near the northern shore of the Salton Sea. The site is in a region of

the Imperial Valley characterized mostly by agriculture and geothermal power production. The surrounding area is dominated by agriculture.

The project is composed of a geothermal Resource Production Facility (RPF), a Power Generation Facility (PGF), and ancillary facilities. The RPF includes all the brine and steam handling facilities from the production wellheads, through the crystallizer/clarifier system, to the injection wellheads. It also includes a solids handling system for brine solids processing, a brine pond, and appropriate steam-venting vessels to support operations during startup/shutdown and emergency conditions. The PGF includes a condensing turbine/generator set, the gas removal and abatement systems, and the heat rejection system. The PGF also includes several power-distribution centers. Common facilities include a control building, a service water pond, and other ancillary facilities.

Worker exposure to safety issues related to this project is limited to onsite activities related to construction and operations.

Fire support services to the site will be supported by the Calipatria City Fire Department (the Calipatria City Fire Department is contracted by the Imperial County Fire Department, which has jurisdiction over the site). The City of Calipatria Fire Station is located at 125 North Park Ave, Calipatria, CA approximately 7 miles from SSU6. Staff contacted the City of Calipatria Fire Department and determined that the response time to the project site is estimated to be 10-12 minutes. The Hazmat first responder is also the Calipatria Fire Department. The Calipatria Fire Chief stated that at current staffing levels, he feels their ability to respond to emergency situations at the plant is adequate (see also **SOCIOECONOMICS** and **TRAFFIC AND TRANSPORTATION** sections of this staff assessment for discussion of emergency responses to the SSU6 location).

IMPACTS

PROJECT SPECIFIC IMPACTS

Industrial environments are potentially dangerous, during both construction and operation of facilities. Workers at the proposed project will be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the SSU6 to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

During construction and operation of the proposed SSU6 there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires may develop from uncontrolled fires or be caused by large

explosions of natural gas or other flammable gasses or liquids. Compliance with all LORS will be adequate to assure protection from all fire hazards.

CUMULATIVE IMPACTS

Staff reviewed the potential for the construction and operation of the SSU6, combined with existing industrial facilities, to result in impacts on the fire and emergency service capabilities of the Calipatria City Fire Department and found that cumulative impacts were insignificant. No request for additional equipment, staffing, or funding has been made by local authorities. Should other power plant projects be proposed for this same general area in the near future new evaluation of fire and medical responses will be needed.

APPLICANT'S PROPOSED MITIGATION

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

CONSTRUCTION SAFETY AND HEALTH PROGRAM

The SSU6 workers will be exposed to hazards typical of construction and operation of a gas-fired combined cycle facility.

Construction Safety Orders are published at California Code of Regulations, title 8, section 1502 et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program will include the following:

- Construction Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 1509);
- Construction Fire Protection and Prevention Plan (Cal Code Regs., tit. 8, § 1920); and
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 1514 - 1522).

Additional programs under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 - 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 - 544) will include:

- Electrical Safety Program;
- Unfired Pressure Vessel Safety Orders;
- Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Prevention Program;
- Scaffolding/Ladder Safety Program;

- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Hot Work Safety Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Confined Space Entry Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Air Monitoring Program;
- Heat and Cold Stress Monitoring and Control Program; and
- Pressure Vessel and Pipeline Safety Program.

The AFC includes adequate outlines of each of the above programs. Prior to construction of the SSU6, detailed programs and plans will be provided pursuant to condition of certification **WORKER SAFETY-1**.

OPERATIONS AND MAINTENANCE SAFETY AND HEALTH PROGRAM

Upon completion of construction and prior to start of operation at the SSU6, the Operations and Maintenance Safety and Health Program will be prepared. This operational safety program will include the following programs and plans:

- Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 3203);
- Emergency Action Plan (Cal Code Regs., tit. 8, § 3220);
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (Cal Code Regs., tit. 8, § 3221); and
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 3401-3411).

In addition, the requirements under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 - 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§ 2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 - 544) will be applicable to the project. Written safety programs, which the applicant will develop for the SSU6, will ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Construction and Operation Health and Safety Programs as well as the Emergency Action Program/Plan, the Construction and Operation Injury and Illness Prevention Programs and the Fire Protection and Prevention Programs (SSU6 2003, AFC Sections 8.16.2.1 and 8.16.2.2). Prior to

operation of the Salton Sea Unit 6 Project, all detailed programs and plans will be provided pursuant to condition of certification **WORKER SAFETY-2**.

SAFETY AND HEALTH PROGRAM ELEMENTS

The Applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operation Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

Injury and Illness Prevention Program (IIPP)

The Applicant will submit an expanded Construction and IIPP to Cal/OSHA for review and comment 30 days prior to both construction and operation of the project.

The IIPP will include the following components as presented in the AFC:

- Identity of person(s) with authority and responsibility for implementing the program;
- System ensuring employees comply with safe and healthy work practices;
- System facilitating employer-employee communications;
- Procedures identifying and evaluating workplace hazards, including inspections to
 - identify hazards and unsafe conditions;
 - Methods for correcting unhealthy/unsafe conditions in a timely manner;
 - Methods of documenting inspections and training and for maintaining records;and
- A training program for:
 - introducing the program;
 - new, transferred, or promoted employees;
 - new processes and equipment;
 - supervisors; and
 - contractors.

Emergency Action Plan

California regulations require an Emergency Action Plan (Cal Code Regs., tit. 8, § 3220). The AFC contains a satisfactory outline for an emergency action plan (SSU6 2001a, AFC Sections 8.7.3.1 and 8.7.3.2).

The outline lists the following features:

- Purpose and Scope of Emergency Action Plan;
- Personnel Responsibilities during Emergencies;
- Specific Response Procedures;
- Evacuation Plan;
- Emergency Equipment Locations;
- Fire Extinguisher Locations;
- Site Security;

- Accident Reporting and Investigation;
- Lockout/Tagout;
- Hazard Communication;
- Spill Containment and Reporting;
- First Aid and Medical Response;
- Respiratory Protection;
- Personal Protective Equipment;
- Sanitation; and
- Work Site Inspections.

Fire Prevention Plan

- California Code of Regulations requires an Operations Fire Prevention Plan (Cal Code Regs., tit. 8, § 3221). The AFC describes a proposed fire prevention plan which is acceptable to staff. The plan will include the following topics:
- Responsibilities of employees and management;
- Procedures for fire control;
- Fixed and portable fire-fighting equipment;
- Housekeeping;
- Employee alarm/communication practices;
- Servicing and refueling areas;
- Training; and
- Flammable and combustible liquid storage.

Staff proposes that the applicant submit a final Fire Protection and Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) and the Imperial County Fire Department for review and approval to satisfy proposed condition of certification **WORKER SAFETY-1 and 2**.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are encountered which, due to process, environment, chemicals or mechanical irritants can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (Cal Code Regs., tit. 8, § 3380-3400). The SSU6 project operational environment will require the availability of PPE.

Information provided in the AFC indicates that all employees required to use PPE will be checked for proper fit and to see if they are medically capable of wearing the equipment. All safety equipment will meet NIOSH or ANSI standards and will carry markings, numbers, or certificates of approval. Respirators will meet NIOSH and California Department of Health and Human Services Standards. Each employee will

be provided with the following information pertaining to the protective clothing and equipment:

- Proper use, maintenance, and storage;
- When the protective clothing and equipment are to be used;
- Benefits and limitations; and
- When and how the protective clothing and equipment are to be replaced. The PPE Program ensures that employers comply with the applicable requirements for PPE and provide employees with the information and training necessary to implement the program.

Operations and Maintenance Written Safety Program

In addition to the specific plans listed above, there are additional LORS applicable to the project, which are called "safe work practices". Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs include the following:

- Fall Protection Program;
- Hot Work Safety Program;
- Confined Space Entry;
- Hearing Conservation Program;
- Hazard Communication Program;
- Process Safety Management (PSM) Program; and
- Contractor Safety Program.

Operations and Maintenance Safety Training Programs

Employees will be trained in the safe work practices described in the above-referenced safety programs.

FIRE PROTECTION

Staff reviewed the information regarding available fire protection services and equipment (SSU6 2002, AFC Sections 2.3.2 Fire Protection Systems and 8.16 Worker Health and Safety) to determine if the project would adequately protect workers and if it would affect the fire protection services in the area. Staff agrees with the applicant that the project should rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services including trained firefighters and equipment for a sustained response would be required by the Calipatria City Fire Department. The applicant intends to meet the minimum fire protection and suppression requirements as mandated by the Imperial County Fire Code, NFPA Standards, and the UFC. Elements include both fixed and portable fire extinguishing systems. Water will be used as the primary extinguishing agent.

The primary supply of water to the fire suppression systems will be from the Imperial Irrigation District (IID) canal water system, with a firewater tank reserve capacity of

300,000-gallons. Chemical and gas extinguishing agents (permanently installed or in portable extinguishers) will be provided in special hazard areas where water would be ineffective or harmful to the equipment being protected.

An automatic sprinkler fire protection system will be provided for the turbine generator and auxiliary equipment areas; an automatic spray system will provide protection for the main step-up transformer; and automatic sprinklers will protect other administration areas. Fire detection sensors will also be installed.

A deluge spray system will provide fire suppression for the generator transformers and auxiliary power transformers. Fire hydrants and hose stations will be used to supplement the plant fire protection system.

In addition to the fixed fire protection system, fire extinguishers will be located throughout the plant Administrative/Maintenance Building, water treatment facility, and other structures as required by the local fire department.

The applicant will be required to provide the final Fire Protection and Prevention Program to staff and to the Imperial Valley Fire Department, prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

FACILITY CLOSURE

The project owner/operator is responsible for maintaining an operational fire protection system during closure activities. The project must also stay in compliance with all applicable health and safety LORS during that time. A facility closure plan will be developed prior to closure to incorporate these requirements.

CONCLUSION AND RECOMMENDATIONS

If the applicant for the proposed Salton Sea Unit 6 project provides a Project Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program as required by conditions of certification **WORKER SAFETY-1 and 2**, staff believes that the project will incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable LORS. Staff also concludes that the proposed plant will not have significant impacts on local fire protection services. The proposed facility is located within an area that is currently served by the local fire department. The fire risks of the proposed facility do not pose significant added demands on local fire protection services.

If the Commission certifies the project, staff recommends that the Commission adopt the following proposed conditions of certification. The proposed conditions of certification provide assurance that the Construction Injury and Illness Prevention Program and the Operations Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the CPM a copy of the Project Construction Injury and Illness Prevention Program, containing the following:

- A Construction Safety Program;
- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Protection and Prevention Plan.

The Safety Program, the Personal Protective Equipment Program, and the Exposure Monitoring Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety Orders. The Construction Fire Protection and Prevention Plan and Emergency Action Plan shall be submitted to the Imperial County Fire Department for review and comment prior to submittal to the CPM.

Verification: At least 30 days prior to site mobilization, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Injury and Illness Prevention Program. The project owner shall provide a letter from the Imperial County Fire Department stating that they have reviewed and commented on the Construction Fire Protection and Prevention Plan Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (Cal Code Regs., tit. 8, § 3221); and;
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted by the project owner to the Cal/OSHA Consultation Service, for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Protection Plan and the Emergency Action Plan shall also be submitted by the project owner to the City of Calipatria Fire Department for review and acceptance.

Verification: At least 30 days prior to the start of operation, the project owner shall submit to the CPM a copy of the final version of the Project Operations and Maintenance Safety & Health Program. It shall incorporate Cal/OSHA Consultation

Service's comments, stating that they have reviewed and accepted the specified elements of the proposed Operations and Maintenance Safety and Health Plan.

REFERENCES

CEOE (CE Obsidian Energy, LLC, Calipatria, California) 2002a. Application for Certification, Salton Sea Unit 6, Volumes I and II. July 29, 2002.

City of Calipatria Fire Department (CCFD). 2003. Personal communication with Fire Chief Chris Hall, January 30, 2003

1998 California Fire Code. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

1997 Uniform Fire Code, Vol. 1. Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Kevin Robinson, Al McCuen and Steve Baker

INTRODUCTION

Facility Design encompasses the civil, structural, mechanical and electrical engineering design of the project. The purpose of the Facility Design analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety; and
- describe the design review and construction inspection process and establish Conditions of Certification that will be used to monitor and ensure compliance with the intent of the engineering LORS and any special design requirements.

FINDINGS REQUIRED

The Warren Alquist Act requires the Energy Commission to “prepare a written decision which includes...(a) Specific provisions relating to the manner in which the proposed facility is to be designed, sited and operated in order to protect environmental quality and assure public health and safety [and] (d)(1) Findings regarding the conformity of the proposed site and related facilities...with public safety standards...and with other relevant local, regional, state and federal standards, ordinances, or laws...” (Pub. Resources Code, §25523).

SUBJECTS DISCUSSED

Subjects discussed in this analysis include:

- Identification of the engineering LORS applicable to facility design;
- Evaluation of the applicant’s proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- Conditions of Certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

SETTING

CE Obsidian Energy proposes to construct and operate a nominally rated 185-megawatt geothermal power plant known as the Salton Sea Unit 6 (SSU6) Project. The project will be located in the Imperial Valley, Imperial County. The site will occupy approximately 80 acres of a 160-acre parcel within the unincorporated area of Imperial County and will lie in seismic zone 4. For more information on the site and related project description, please see the **Project Description** section of this document. References to “the County” designate Imperial County. Additional engineering design details are contained in the Application for Certification (AFC), Volume II, Appendices A through E (CEOC 2002a).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical and electrical) are described in the AFC (CEOC 2002a, Volume II, Appendices A through E). Some of these LORS include the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), and guidelines promulgated by the American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM) and American Welding Society (AWS).

ANALYSIS

The basis of this analysis is the applicant’s proposed analysis and construction methods and list of engineering LORS and design criteria set forth in the AFC.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage and site access. Staff has assessed the criteria for designing and constructing linear support facilities such as the production/injection well lines and electric transmission line. The applicant proposes to use accepted industry standards (see AFC Appendices A through E for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes Conditions of Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly to repair or replace, that require a long lead time to repair or replace, or that are used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 1998 edition of the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect at the time design and construction of the project actually commences. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 1998 CBSC is in effect, the 1998 CBSC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1** (below), which in part, requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

PROJECT QUALITY PROCEDURES

The AFC (CEOE 2002a, § 4.2.7) describes a project Quality Program that will be used on the project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and to ensure that all facility design Conditions of Certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants

hired to cover technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Engineering and compliance staff will invite either the local building authority, the County, or a third party engineering consultant, to act as CBO for the project. When an entity has been identified to perform the duties of CBO, Energy Commission staff will complete a Memorandum of Understanding (MOU) with that entity that outlines its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed Conditions of Certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse are allowed to proceed without approval of the plans. The applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from "mothballing" to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;

- all applicable LORS, local/regional plans and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- decommissioning alternatives, other than complete site restoration.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.
2. Staff has evaluated the proposed engineering LORS, design criteria and design methods in the record, and concludes that the design, construction and eventual closure of the project are likely to comply with applicable engineering LORS.
3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.
4. Whereas future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

RECOMMENDATIONS

Energy Commission staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;
2. The project be designed and built to the 1998 CBSC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and
3. The CBO shall review the final designs, conduct plan checking and perform field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct and inspect the project in accordance with the 1998 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval. (The CBSC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

In the event that the initial engineering designs are submitted to the CBO when a successor to the 1998 CBSC is in effect, the 1998 CBSC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

Verification: Within 30 days after receipt of the Certificate of Occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation and inspection requirements of the applicable LORS and the Energy Commission's Decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [1998 CBC, Section 109 – Certificate of Occupancy].

GEN-2 Prior to submittal of the initial engineering designs for CBO review, the project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a Master Drawing List and a Master Specifications List. The schedule shall contain a list of proposed submittal packages of designs, calculations and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM when requested.

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List and the Master Specifications List of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 1** below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

**Table 1:
Major Structures and Equipment List**

| Equipment/System | Quantity (Plant) |
|--|-----------------------------|
| Steam Turbine (ST) Foundation and Connections | 1 |
| Steam Turbine Generator Foundation and Connections | 1 |
| Steam Condenser and Auxiliaries Foundation and Connections | 1 |
| Condensate (HP) Hotwell Pumps Foundation and Connections | 2 |
| Condensate (SP/LP) Hotwell Pumps Foundation and Connections | 2 |
| Condensate Storage Tank Foundation and Connections | 1 |
| Filter Press System Structure, Foundation and Connections | 1 |
| Thickener Foundation and Connections | 2 |
| Brine Production Wellpads | 5 |
| Brine Injection Wellpads | 3 |
| Purge Water Pumps (HP/SP/LP) Foundation and Connections | 6 |
| Main Transformer Foundation and Connections | 1 |
| Counterflow Cooling Tower Foundation and Connections – 10 cells each | 2 |
| Vertical Circulating Water Pumps Foundation and Connections | 6 |
| Blowdown Pumps Foundation and Connections | 2 |
| Cooling Tower Wetdown Pumps Foundation and Connections | 2 |
| Auxiliary Cooling Water Pumps Foundation and Connections | 2 |
| Benzene Abatement Structure, Foundation and Connections | 1 |
| H ₂ S Abatement Structure, Foundation and Connections | 1 |
| NCG Removal System Structure, Foundation and Connections | 1 |
| Steam Vent Tank Foundation and Connections | 4 |
| Waste Water Collection System Foundation and Connections | 1 |
| Main Injection Pumps Foundation and Connections | 4 |
| Fire Protection System | 1 |
| Injection Booster Pump Foundation and Connections | 4 |
| Brine Pond Pumps Foundation and Connections | 2 |
| Generator Breakers Foundation and Connections | 3 |
| Transformer Breakers Foundation and Connections | 3 |
| Wellhead Separators Foundation and Connections | 4 |
| SP Crystallizers Foundation and Connections | 4 |
| LP Crystallizers Foundation and Connections | 4 |
| Atmospheric Flash Tanks Foundation and Connections | 4 |
| Dilution Water Heater/Pumps Foundation and Connections | 2 |
| Scrubbers Foundation and Connections | 6 |
| Demisters Foundation and Connections | 6 |
| Primary Clarifiers Foundation and Connections | 2 |
| Secondary Clarifiers Foundation and Connections | 2 |

| Equipment/System | Quantity (Plant) |
|---|------------------|
| Vacuum System Foundation and Connections | 4 |
| Electric Motor Driven Fire Pump Foundation and Connections | 1 |
| Diesel Engine Fire Pump Foundation and Connections | 1 |
| Firewater Storage Tank Foundation and Connections | 1 |
| Compressed Air System Foundation and Connections | 2 |
| HCL Tank Foundation and Connections | 1 |
| Emergency Relief Tanks Structure, Foundation and Connections | 4 |
| Seed Pumps Foundation and Connections | 4 |
| Control Room Structure, Foundation and Connections | 1 |
| RO/Potable Water Systems | 2 |
| Drainage Systems (including sanitary drain and waste) | 1 Lot |
| High Pressure and Large Diameter Piping and Pipe Racks | 1 Lot |
| HVAC and Refrigeration Systems | 1 Lot |
| Temperature Control and Ventilation Systems (including water and sewer connections) | 1 Lot |
| Building Energy Conservation Systems | 1 Lot |
| Substation/Switchyard, Buses and Towers | 1 Lot |
| Electrical Duct Banks | 1 Lot |

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 1998 CBC [Chapter 1, Section 107 and Table 1-A, Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A, Grading Plan Review Fees; and Table A-33-B, Grading Permit Fees], adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be as otherwise agreed by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next Monthly Compliance Report indicating that the applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer or civil engineer, as a resident engineer (RE), to be in general responsible charge of the project [Building Standards Administrative Code (Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities)]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated

responsibility for mechanical and electrical portions of the project respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

The RE shall:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;
3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;
4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a soils engineer, or a geotechnical engineer or a civil engineer

experienced and knowledgeable in the practice of soils engineering; and C) an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: D) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; E) a mechanical engineer; and F) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.] All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all responsible engineers assigned to the project [1998 CBC, Section 104.2, Powers and Duties of Building Official].

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the Foundation Investigations Report, Geotechnical Report or Soils Report prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;
2. Design, or be responsible for design, stamp, and sign all plans, calculations and specifications for proposed site work, civil works and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and
3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes in the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;
2. Prepare the Foundation Investigations Report, Geotechnical Report or Soils Report containing field exploration reports, laboratory tests and engineering analysis detailing the nature and extent of the soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load [1998 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations];
3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33; Section 3317, Grading Inspections; (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both); and
4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations [1998 CBC, section 104.2.4, Stop orders].

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare final soils grading report; and
2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33; Section 3317, Grading Inspections; (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;
2. Provide consultation to the RE during design and construction of the project;
3. Monitor construction progress to ensure compliance with engineering LORS;
4. Evaluate and recommend necessary changes in design; and
5. Prepare and sign all major building plans, specifications and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 1998 CBC, Chapter 17 [Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection)]; and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Observe the work assigned for conformance with the approved design drawings and specifications;
3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action [1998 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]; and
4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next Monthly Compliance Report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend the corrective action required [1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next Monthly Compliance Report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. When the work and the "as-built" and "as graded" plans conform to the approved final plans, the project owner shall notify the CPM regarding the CBO's final approval. The marked up "as-built" drawings for the construction of structural and architectural work shall be submitted to the CBO. Changes approved by the CBO shall be identified on the "as-built" drawings [1998 CBC, Section 108, Inspections]. The project owner shall retain one set of approved engineering plans, specifications and calculations at the project site or at another accessible location during the operating life of the project [1998 CBC, Section 106.4.2, Retention of Plans].

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next Monthly Compliance

Report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing final approved engineering plans, specifications and calculations as described above, the project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such documents.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils Report, Geotechnical Report or Foundation Investigations Report required by the 1998 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations].

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next Monthly Compliance Report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area [1998 CBC, Section 104.2.4, Stop orders].

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 1998 CBC, Chapter 1, Section 108, Inspections; Chapter 17, Section 1701.6, Continuous and Periodic Special Inspection; and Appendix Chapter 33, Section 3317, Grading Inspection. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO and the CPM [1998 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The

project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a Non-Conformance Report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following Monthly Compliance Report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage facilities, the project owner shall obtain the CBO's approval of the final "as-built" grading plans for the erosion and sedimentation control facilities. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans [1998 CBC, Section 3318, Completion of Work].

Verification: Within 30 days (or project owner and CBO approved alternative timeframe) of the completion of the erosion and sediment control mitigation and drainage facilities, the project owner shall submit to the CBO the final as-built grading plans and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next Monthly Compliance Report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 1**, above):

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Large field fabricated tanks;
4. Turbine/generator pedestal; and
5. Switchyard structures.

Construction of any structure or component shall not commence until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (i.e., highest loads, or lowest allowable stresses shall govern). All plans, calculations and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations and specifications [1998 CBC, Section 108.4, Approval Required];
3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation [1998 CBC, Section 106.4.2, Retention of plans; and Section 106.3.2, Submittal documents];
4. Ensure that the final plans, calculations and specifications clearly reflect the inclusion of approved criteria, assumptions and methods used to develop the design. The final designs, plans, calculations and specifications shall be signed and stamped by the responsible design engineer [1998 CBC, Section 106.3.4, Architect or Engineer of Record]; and
5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to the applicable LORS [1998 CBC, Section 106.3.4, Architect or Engineer of Record].

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2** above, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next Monthly Compliance Report, a copy of a statement from the CBO that the proposed structural plans, specifications and calculations have been approved and are in conformance with the requirements set forth in the applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and
5. Reports covering other structural activities requiring special inspections shall be in accordance with the 1998 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection); Section 1702, Structural Observation and Section 1703, Nondestructive Testing.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM [1998 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]. The NCR shall reference the Condition(s) of Certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 1998 CBC, Chapter 1, Section 106.3.2, Submittal documents and Section 106.3.3, Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 1998 CBC shall, at a minimum, be designed to comply with the requirements of that Chapter.

Verification: At least 30 days (or project owner and CBO approved alternate timeframe) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications and calculations, including a copy of the signed and stamped engineer's certification.

Verification: The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Facility Design Table 1**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of said construction [1998 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 1998 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval].

The responsible mechanical engineer shall stamp and sign all plans, drawings and calculations for the major piping and plumbing systems subject to the CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards [Section 106.3.4, Architect or Engineer of Record], which may include, but not be limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Specific City/County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [1998 CBC, Section 104.2.2, Deputies].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 1**, Condition of Certification **GEN-2** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by the applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of said installation [1998 CBC, Section 108.3, Inspection Requests].

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and
2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of said construction. The final plans, specifications and calculations shall include approved criteria, assumptions and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and

calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS [1998 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for electrical equipment and systems 480 volts and higher, listed below, with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations [CBC 1998, Section 106.3.2, Submittal documents]. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS [1998 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

A. Final plant design plans to include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
2. system grounding drawings.

B. Final plant calculations to establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the Monthly Compliance Report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and

3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission Decision.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

REFERENCES

CEOE (CE Obsidian Energy, LLC, Calipatria, California) 2002a. Application for Certification for Salton Sea Unit 6, Volume I & II, July 26, 2002.

GEOLOGY, MINERAL RESOURCES, AND PALEONTOLOGY

Dal Hunter, Ph.D., C.E.G.

INTRODUCTION

In the geology, mineral resources, and paleontology section, staff discusses potential impacts of the proposed Salton Sea Unit 6 (SSU6) project regarding geologic hazards, geologic (including mineralogic), and paleontologic resources. Energy Commission staff's objective is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources during project construction, operation and closure. A brief geological and paleontological overview of the project is provided. The section concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and paleontologic resources, with the inclusion of Conditions of Certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The applicable LORS are listed in the Application for Certification (AFC), in Section 5.2.5 of the AFC (CE Obsidian Energy, LLC (CEOE) 2000a). The following is a brief description of the LORS for geologic hazards and resources, and paleontologic resources.

FEDERAL

The proposed SSU6 is not located on federal land. As such, there are no federal LORS for geologic, mineralogic, or paleontologic resources for the proposed project.

STATE AND LOCAL

The California Building Code (*CBC*), 1998 edition, is based upon the Uniform Building Code (*UBC*), 1997 edition, which was published by the International Conference of Building Officials. The *CBC* is a series of standards that are used in project investigation, design (Chapters 16 and 18), and construction (including grading and erosion control as found in Appendix Chapter 33). The *CBC* supplements the *UBC*'s grading and construction ordinances and regulations. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 1998 CBSC is in effect, the 1998 *CBC* provisions, identified herein, shall be replaced with the applicable successor provisions.

The California Environmental Quality Act Guidelines Appendix G provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) pose questions about the project's effect on mineral resources.

The “Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures” (Society of Vertebrate Paleontology [SVP], 1995) is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. They were adopted in October 1995 by the Society of Vertebrate Paleontology (SVP), a national organization.

ENVIRONMENTAL SETTING

The proposed SSU6 is located within the Colorado Desert geomorphic province at the southern end of the Salton Sea in Imperial County, California. This area within the Colorado Desert is characterized by a structural depression known as the Salton Trough, the San Andreas Fault system, and other major faults. The Salton Trough is characterized by flat topography, generally below mean sea level (MSL) adjacent to the Salton Sea, with the Chocolate Mountains to the east and the Superstition Hills to the west. Major geologic units in the vicinity of the site include the Pleistocene Brawley Formation and Holocene Lake Cahuilla Beds. The Pleistocene Brawley Formation consists of tectonically deformed cemented lacustrine sediments, including silts and clays. The Holocene Lake Cahuilla Beds consist of flat-lying lacustrine sediments including sandy deltaic and beach deposits, silt, and clay associated with ancient Lake Cahuilla. During the Pleistocene and Holocene, the Salton Trough area was periodically inundated by floodwaters from the Colorado River flowing in from the south.

Exploration at the site, by the applicant, generally encountered variable lean clay, silt, silty sand, and clayey sand lacustrine (lake) deposits. Portions of these soil units were interbedded. The fine-grained soils, including lean clay and silt were generally classified as brown, soft to firm, and as exhibiting low to medium plasticity. The coarse-grained soils, including silty sand and clayey sand were generally classified as brown, medium dense, and as exhibiting low plasticity. The lacustrine deposits were encountered to 77-1/2 feet, the maximum depth of exploration (Geotechnics, 2002).

ANALYSIS AND IMPACTS

There are two types of impacts considered in this section. The first are geologic hazards, which could impact proper functioning of the proposed facility and include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, and tsunamis and seiches. The second considers potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

STAFF’S CRITERIA FOR DETERMINING IMPACT SIGNIFICANCE

There are no federal LORS with respect to geologic hazards and geologic and mineralogic resources; however, the California Building Code (CBC) provides geotechnical and geological investigation and design guidelines, which engineers must adhere to when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to being able to adequately design and construct the proposed facility.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, geologic and mineral resource maps for the surrounding area are reviewed, in addition to any site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. Operating procedures of the proposed facility, such as ground water extraction and mass grading operations are reviewed, to the extent known, to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as any site-specific information provided by the applicant, in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, Conditions of Certification are applied to project approval, which outline procedures required during construction to mitigate impacts to potential resources.

GEOLOGIC HAZARDS

The AFC (CE Obsidian Energy, LLC (CEOE) 2000a) provides good documentation of potential geologic hazards at the SSU6 plant site. Review of the AFC, coupled with our independent research, indicates that potential geologic hazards at the site are high. Our independent research included review of available geologic maps, reports, and related data of the SSU6 plant site and associated linear facility areas. Geological information was available from the California Geological Survey (CGS), U. S. Geological Survey (USGS), and other governmental organizations.

Detailed geological discussion and information about the project's linear facilities was not included in the AFC (CE Obsidian Energy, LLC (CEOE) 2000a). However, given the geology and borings present at the site and our independent literature review, the potential for these geologic hazards along the linear facilities is high. In order to accurately assess the potential for liquefaction, dynamic compaction, hydrocompaction, subsidence, and expansive soils along the linear facilities, subsurface exploration and associated laboratory testing and analyses should be performed during the design-level geotechnical investigation.

There are no current standards that require linear facilities to be designed to resist fault rupture or liquefaction, even when these facilities cross an active fault (Anderson, 2001). However, Imperial County does require utilities to submit an operation plan *"describing the effects of failures at the fault and the various emergency facilities and procedures which exist to assure that failure does not threaten public safety"* (Imperial County, 1993).

Faulting and Seismicity

Energy Commission staff reviewed the California Geological Survey (CGS) publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, dated 1994 (CGS, 1994), *Geologic Map of California – Salton Sea Sheet* (Jennings, 1967), *Alquist-Priolo Zones* (CGS, 2000), *Preliminary Geologic Map of the California – Baja California Border Region* (CGS, 1984), and *Maps of Known Active Fault Near-source Zones in California and Adjacent Parts of Nevada* (International

Conference of Building Officials [ICBO], 1998). The project is located within Seismic Zone 4 as delineated on Figure 16-2 of the *CBC*.

The closest known active fault is the Brawley Fault, located approximately 1/2 mile east of the site. The plant site, well pads, and portions of the associated linear facilities are within the Brawley Seismic Zone. CEC staff has calculated an estimated deterministic peak horizontal ground acceleration for the plant site in the range of 0.41g. This estimate is based upon a moment magnitude 6.4 earthquake on the Brawley Fault. A second active fault, the Elmore Ranch Fault, is located approximately 4 miles to the northwest. Staff has calculated an estimated deterministic peak ground acceleration for the Elmore Ranch Fault in the range of 0.33g. This estimate is based on a moment magnitude 6.6 earthquake on the Elmore Ranch Fault. Other active faults within the vicinity of the site, include the San Andreas (Southern and Coachella segments) Fault, the San Jacinto (Superstition Hills, Superstition Mountain, and Coyote Creek segments) Fault, and the Imperial Fault. The *CBC* designates a minimum design ground acceleration of 0.4g for the entire project. The closest pre-Holocene fault is located approximately 15-1/2 miles northeast of the site (Morton, 1966).

Liquefaction

Liquefaction is a nearly complete loss of soil shear strength that can occur during a seismic event. During the seismic event, cyclic shear stresses cause the development of excessive pore water pressure between the soil grains, effectively reducing the internal strength of the soil. This phenomenon is generally limited to unconsolidated, clean to silty sand (up to 35 percent non-plastic fines) and very soft silts lying below the ground water table. The higher the ground acceleration caused by a seismic event, the more likely liquefaction is to occur. Severe liquefaction can result in catastrophic settlements of overlying structural improvements and lateral spreading of the liquefied layer when confined vertically but not horizontally. Since the site is underlain by interbedded, saturated silty sands, and the depth to ground water is approximately 4 feet; the potential for liquefaction is high; however, the potential for catastrophic liquefaction is probably much lower.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements. Since the site is generally underlain by interbedded medium dense silty sand soils, the potential for dynamic compaction is high.

Hydrocompaction

Partially saturated soils can possess bonds that are a result of chemical precipitates that accumulate under semi-arid conditions. Such soluble compound bonds provide the soils with cohesion and rigidity; however, these bonds can be destroyed upon wetting. When destroyed, a substantial decrease in the material's void ratio is experienced even though the vertical pressure does not change. Materials that exhibit this decrease in void ratio and corresponding decrease in volume with the addition of water are defined as collapsible soils. Collapsible soils are typically limited to true loess, fine flash flood

deposits, clayey loose sands, loose sands cemented by soluble salts, and windblown silts. Since the site is underlain by medium dense soils that were deposited in a lacustrine environment and are generally saturated (below the ground water table), the potential for hydrocompaction is negligible.

Subsidence

Ground subsidence is typically caused when ground water is drawn down by irrigation activities such that the effective unit weight of the soil mass is increased, which in turn increases the effective stress on underlying soils, resulting in consolidation/settlement of the underlying soils. Subsidence may also be caused by regional tectonic processes or withdrawal of geothermal fluids. Typically, these forms of subsidence affect a large area. Regional tectonic subsidence may result in approximately 1.6 inches of subsidence annually (Lofgren, 1987) over the Salton Trough area. Since the SSU6 will reinject spent geothermal fluids with injection wells, subsidence due to geothermal fluid withdrawal is expected to result in a low potential for settlement that would significantly impact the plant.

Expansive Soils

Soil expansion occurs when clay-rich soils, with an affinity for water, exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which, in turn, causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. As reported in the boring logs, the site generally is underlain by silty sand, clayey sand, silt, and lean clay soils (Geotechnics, 2002). A low to medium potential for expansion may be present in the clayey sand and lean clay soils given the limited geotechnical testing data available.

Landslides

Landslides typically involve rotational slump failures within surficial soils/colluvium and/or weakened bedrock that are usually implemented by an increase of the material's moisture content above a layer, which exhibits a relatively low strength. Debris-flows are shallow landslides that travel downslope very rapidly as muddy slurry. Since the site, transmission lines, and geothermal pipeline areas are generally topographically flat, the potential for landslides is negligible.

Tsunamis and Seiches

Tsunamis and seiches are earthquake-induced waves, which can inundate low-lying areas adjacent to large bodies of water. The proposed site is situated approximately 227 feet to 232 feet below mean sea level and approximately 1,000 feet southeast of the Salton Sea with an approximate surface elevation of 227 feet below mean sea level. The Gulf of California is located approximately 120 miles to the southeast of the site with higher ground elevations present in-between. As a result, the potential for tsunamis from the Gulf of California to affect the site is considered low, but the potential for seiches from the Salton Sea to affect the site is considered high. No other large bodies of water are present near the plant site or associated linear facilities.

Geothermal Reservoir

Exploration and modeling of the geothermal reservoir has been performed by the applicant using the computer program TETRAD. Numerous test, production, and injection wells have been drilled since 1972 to characterize and utilize the geothermal resource. Geothermal reservoir modeling by the applicant was based upon available data and was used to minimize the impact from SSU6 operations on the geothermal reservoir and existing Salton Sea geothermal facilities. Locations and depths of both production and injection wells were optimized using the TETRAD model.

Volcanic Activity

Volcanic activity typically involves eruptions of lava, pyroclastics, or tephra that may be non-explosive or explosive depending upon the geologic setting. Structures and populations adjacent to centers of volcanic activity may be severely impacted by the sudden onset of volcanic activity. The U. S. Geological Survey has mapped the plant site area and portions of the linear facilities as a combined flowage hazard zone (Miller, 1989), or an area adjacent to explosive volcanoes or vents. Since the SSU6 plant site is adjacent to Obsidian Butte, a volcanic vent active in the late Pleistocene and a part of the Salton Buttes, the potential for impact to the SSU6 plant site is high from volcanic activity.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff have reviewed applicable geologic maps and reports for this area (Kohler, 2002; Larose et al., 1999; DOGGR, 1982; Tooker and Beeby, 1990; and Morton, 1966). Based on this information and the information contained in the AFC (CE Obsidian Energy, LLC (CEOE) 2000a and b), there are no known mineralogic resources located at or immediately adjacent to the proposed SSU6 site. However, Obsidian Butte represents a significant geologic resource. Obsidian Butte is a small volcanic glass dome that is part of the Salton Buttes and is a popular stop during geologic field trips. Minor pumice and aggregates were mined in the past within the Salton Buttes, but mining has since been abandoned. The production well pad on Obsidian Butte will not result in closure or access restrictions to the area. Large quantities of CO₂ gas were produced from shallow wells northeast of the plant site from 1933 to 1954 for the production of dry ice. The plant site is also located within a known geothermal resource area as designated by the U. S. Geological Survey. Based upon a review of available information, staff concludes that the proposed SSU6 has a low potential to impact geologic or mineralogic resources.

The applicant's consultant conducted a paleontologic resources field survey and a sensitivity analysis for the proposed SSU6 and the proposed linear facility improvements to support the SSU6. No significant fossil localities were identified at the SSU6 site or directly under the associated linear facilities. However, fossils were found in similar geologic units (Lake Cahuilla Beds) adjacent to the proposed linear facilities and within 1 mile of the plant site. Surficial geologic units were assigned a "high" sensitivity rating, with respect to potentially containing paleontological resources. The underlying Brawley Formation, which may be excavated for foundations and utilities at the plant site and electrical transmission towers, was also assigned a "high" sensitivity rating with respect to potentially containing paleontological resources.

Staff asked the San Bernardino County Museum (SBCM) for a literature review and a check of the Regional Paleontologic Locality Inventory (RPLI). In a letter dated November 12, 2002, SBCM verified that there are no known paleontological resources at the plant site, but determined the Lake Cahuilla Beds and the Brawley Formation have a “high” sensitivity rating with respect to potentially containing paleontological resources, and that a mitigation plan would be necessary. Based on review of available information, staff concludes that the proposed SSU6 project has high potential to contain significant paleontologic resources.

PROJECT SPECIFIC IMPACTS

Seismicity, liquefaction, and seiches potential represent the main geologic hazards at this site. No geologic or mineralogic resources are known to exist in the area with the exception of Obsidian Butte. The (confidential) Paleontologic Resources Report (CE Obsidian Energy, LLC (CEOE) 2000a) assigns a sensitivity rating of high for all geologic units, which underlie the proposed facility and associated linears. The Conditions of Certification obligate the developer to follow the requirements of the California Building Code, with respect to project design and construction. The paleontological conditions mandate procedures for worker training, site monitoring, and resource preservation for sites with a potential to encounter vertebrate fossils. Conditions of Certification **GEN-1**, **GEN-5**, **CIVIL-1 (Facility Design)**, and **PAL-1 to PAL-7** should mitigate any potential hazards and resource impacts discussed above to a less than significant level.

CUMULATIVE IMPACTS

The SSU6 site lies in an area, which exhibits moderate to high geologic hazards and no known geologic or mineralogic resources, other than Obsidian Butte, a popular geologic field trip stop. Based on this information and the proposed Conditions of Certification to mitigate potential project specific impacts, it is staff's opinion that the potential for significant adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources, from the proposed project, is low. There is some potential for new geothermal production wells to impact existing geothermal power plants by depleting the resource. However, the applicant has used state of the art geothermal resource modeling to locate their wells and to minimize this potential cumulative impact. Since the resource is the result of a plate boundary spreading center and, therefore, enormous and because the nearby power plants are owned by affiliates of the applicant, the potential for cumulative impact due to resource depletion is probably negligible.

FACILITY CLOSURE

A definition and general approach to closure is presented in the **General Conditions** section of this assessment. Facility closure activities are not anticipated to impact geologic, mineralogic, or paleontologic resources. This is due to the fact that no such resources are known to exist at the proposed project site. In addition, decommissioning and closure of the power plant should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed in plant decommissioning and closure will have been disturbed during construction and operation of the facility.

RESPONSE TO PUBLIC AND AGENCY COMMENT

Staff has not received comments regarding geology, paleontology, or surface water from the public or local agencies at this time.

A project geotechnical report is required by the *CBC* and the Conditions of Certification (**GEN- 1**, **GEN-5**, and **CIVIL-1**) of this document.

CONCLUSIONS AND RECOMMENDATIONS

The applicant will likely be able to comply with all applicable LORS. Design, construction, and operation of the project should have no significant impacts on paleontologic, geologic, or mineralogic resources. Staff proposes to ensure compliance with applicable LORS and protection of potential paleontologic resources with the adoption of the proposed Conditions of Certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General Conditions of Certification with respect to Geology are covered under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section. Conditions of Certification for Paleontology follow:

PAL-1 The project owner shall provide the CPM with the resumé and qualifications of its Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and report, the project owner shall obtain CPM approval of the replacement. The project owner shall submit to the CPM to keep on file, resumé of the qualified Paleontological Resource Monitors PRMs. If a PRM is replaced, the resumé shall also be provided to the CPM.

The PRS resumé shall include the names and phone numbers of references. The resumé shall also demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995.

The experience of the PRS shall include the following:

1. institutional affiliations or appropriate credentials and college degree;
2. ability to recognize and collect fossils in the field;
3. local geological and biostratigraphic expertise;
4. proficiency in identifying vertebrate and invertebrate fossils and;
5. at least three years of paleontological resource mitigation and field experience in California, and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic resource monitors (PRMs) shall have the equivalent of the following qualifications:

1. BS or BA degree in geology or paleontology and one year experience monitoring in California; or
2. AS or AA in geology, paleontology or biology and four years experience monitoring in California; or
3. Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit a resumé and statement of availability of its designated PRS for on-site work.

At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumé naming anticipated monitors for the project and stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumé to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor beginning on-site duties.

Prior to the termination or release of a PRS, the project owner shall submit the resumé of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and the plan and profile drawings for the utility lines would normally be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and can be of such as scale that 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant or linear facility changes, the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

If construction of the project will proceed in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Prior to work commencing on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner shall submit to the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities and may be modified with CPM approval. This document shall be used as a basis for discussion in the event that on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of the Vertebrate Paleontology (SVP, 1995) and shall include, but not be limited to, the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and collection; identification and inventory; preparation of final reports; and transmittal of materials for curation will be performed according to the PRMMP procedures;
2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the Conditions of Certification;
3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;
4. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed schedule for the monitoring and sampling;
5. A discussion of the procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;
6. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
7. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets

- the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources;
8. Identification of the institution that has agreed to receive any data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and,
 9. A copy of the paleontological Conditions of Certification.

Verification: At least (30) days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship of the PRMMP by the PRS, and acceptance of the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all project managers, construction supervisors and workers who are involved with or operate ground disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick-off for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern.

The Worker Environmental Awareness Program (WEAP) shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Good quality photographs or physical examples of vertebrate fossils that may be expected in the area shall be provided;
3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. A Certification of Completion of WEAP form signed by each worker indicating that they have received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP including the brochure with the set of reporting procedures the workers are to follow.

At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning on using a video for interim training.

If an alternate paleontological trainer is requested by the owner, the resumé and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

In the Monthly Compliance Report (MCR) the project owner shall provide copies of the WEAP Certification of Completion forms with the names of those trained and the trainer or type of training offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitors consistent with the PRMMP, all construction-related grading, excavation, trenching, and augering in areas where potentially fossil-bearing materials have been identified. In the event that the PRS determines full time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring different from the accepted schedule presented in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring. The letter or email shall include the justification for the change in monitoring and submitted to the CPM for review and approval.
2. The project owner shall ensure that the PRM(s) keeps a daily log of monitoring of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.
3. The project owner shall ensure that the PRS immediately notifies the project owner and the CPM within 24-hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the Conditions of Certification.
4. Either the project owner or the PRS shall notify the CPM within 24-hours of a significant find of fossil materials, (or Monday morning in the case of a weekend) when there has been a significant find or a halt of construction activities due to the discovery of fossil materials.

The project owner shall ensure that the PRS prepares a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Report. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities and general locations of excavations, grading, etc. A section of the report will include the geologic units or subunits encountered; descriptions of sampling within each unit; and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring including any incidents of non-compliance and any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the project owner shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is an unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the project construction.

Verification: The project owner shall maintain in their compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Paleontological Resources Report (PRR) (See PAL-7). The project owner shall be responsible to pay any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submitted to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within (90) days after completion of ground disturbing activities, including landscaping, the project owner shall submit the Paleontological Resources Report under confidential cover to the CPM.

**Certification of Completion of Worker
Environmental Awareness Program
SALTON SEA UNIT 6 (02-AFC-2)**

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on Cultural, Paleontology and Biological Resources for all personnel (i.e. construction supervisors, crews and plant operators) working on-site or at related facilities. By signing below, the participant indicates that they understand and shall abide by the guidelines set forth in the Program materials. Include this completed form in the Monthly Compliance Report.

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 Paleo Trainer: _____ Signature: _____ Date: _____
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 Bio Trainer: _____ Signature: _____ Date: _____
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- CE Obsidian Energy, LLC (CEOE) 2000b. Application for Confidential Designation Cultural and Paleontological Resources, July 29, 2002.
- California Geological Survey (CGS), 2000. Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California – Southern Region, CGS CD 2000-003.
- CGS, 1994. *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, Scale: 1:750,000.
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POWER PLANT EFFICIENCY

Shahab Khoshmashrab

INTRODUCTION

The Energy Commission makes findings as to whether energy used by the Salton Sea Unit 6 Project (SSU6) would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the SSU6's consumption of energy creates a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- determine whether the facility would likely present any adverse impacts upon energy resources;
- determine whether these adverse impacts are significant; and if so,
- determine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

No federal laws apply to the efficiency of this project.

STATE

California Environmental Quality Act Guidelines

CEQA Guidelines state that the environmental analysis "...shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Cal. Code Regs., tit. 14, § 15126.4(a)(1)). Appendix F of the Guidelines suggests consideration of such factors as decreasing reliance on natural gas and oil; and increasing reliance on renewable energy sources (Cal. Code regs., tit. 14, § 15000 et seq., Appendix F).

LOCAL

No local ordinances apply to power plant efficiency.

SETTING

CE Obsidian Energy, LLC (CEOE, applicant) proposes to construct and operate the 185 MW (nominal net output) SSU6, a merchant class geothermal-powered generating facility, selling power to the Imperial Irrigation District (IID) and the power market (CEOE 2002a, AFC §§ 1.2, 1.2.3, 2.2, 2.3). (Note that this rating is an approximate value

based upon preliminary design information and generating equipment manufacturers' projected performance with the plant operating at full load.)

The SSU6 Power Generating Facility would consist of one geothermal power block, including a condensing steam turbine/generator set, the gas removal and abatement systems, and the heat rejection system (CEOE 2002a, AFC §§ 1.3.2.1, 3.1, 3.3.1). The steam turbine would be a multi-casing, triple-pressure, exhaust flow condensing turbine. The Resource Production Facility would provide geothermal fluid from production wells through above ground pipelines to the steam handling system, where the steam would be separated from the liquid phase (flashed).

ANALYSIS

The SSU6 would use geothermal resources in the form of steam, consuming substantial amounts of energy. However, according to the State Department of Commerce, Division of Oil, Gas and Geothermal Resources (DOGGR 2002), CEC staff (CEC 2002e) and the Committee, sufficient resources exist to supply the SSU6 for its designed 30-year life.

Geothermal power plants produce electric power by expanding steam in the steam turbine. This steam comes from heated, pressurized brine in the ground. Geothermal resources are considered renewable if the quantities of water and heat used are being replaced continuously. Water recharge can occur from rainfall, subterranean drainage, or human efforts. Heat recharge occurs when there is sufficient heat, near enough to the surface, to replace that used in power generation. The geothermal resource available at the Salton Sea Known Geothermal Resource Area (the Salton Sea KGRA) can be considered renewable because a magma intrusion near the surface provides heat recharge, and subterranean and surface drainage from an area of 8,360 square miles provides water recharge.

The applicant proposes to use a high efficiency, triple-pressure steam turbine. The geothermal fluid would be conveyed to the steam handling system where steam would be separated from the brine in three flashes, producing high-pressure, standard-pressure and low-pressure steam for use in the turbine. Chemically stabilized brine flows from the steam handling system to the solids handling system where solids are removed, after which the brine is injected back into the ground. The turbine uses the steam produced at all three pressures to generate power, the most efficient steam turbine configuration possible. In the older, less efficient geothermal power plants currently operating at the Salton Sea, steam is produced in two pressures, high and low. Before entering the steam turbine, the high-pressure steam is throttled down to the pressure of the low-pressure steam, where it is mixed with the rest of the low-pressure steam. Only this low-pressure (low energy content) steam is expanded in the turbine to generate power, and much of the energy in the higher pressure (higher energy content) steam is wasted. The proposed steam turbine uses steam far more efficiently than the older machines.

Alternative Generating Technologies

Alternative generating technologies for the SSU6 are considered in the AFC (CEOE 2002a, AFC § 6.2.3). Conventional boiler and steam turbine, combined cycle combustion turbine, simple cycle combustion turbine, natural gas, coal, oil, solar, wind, hydroelectric, biomass, nuclear and municipal solid waste technologies are all considered. Given the facts that geothermal generating technology decreases reliance on natural gas and oil, and increases reliance on renewable energy sources, combined with the project objectives and location, staff agrees with the applicant that only geothermal generating technology is feasible.

Alternative Heat Rejection System

The applicant proposes to employ an evaporative cooling system (mechanical draft, counter flow cooling towers) as the means for rejecting power cycle heat (mainly condensate heat) (CEOE 2002a, AFC §§ 3.3.3.2, 3.3.5.1, 6.2.3.14). An alternative heat rejection system would utilize an air-cooled condenser.

The local climate in the Salton Sea area is characterized by high temperatures and low relative humidity (low wet-bulb temperature). In low temperatures and high relative humidity (low dry-bulb temperature), the air-cooled condenser performs relatively efficiently compared to the evaporative tower. However, at the SSU6 project area (low wet-bulb temperature and high dry-bulb temperature), the air-cooled condenser performance is relatively poor compared to that of an evaporative cooling tower. Furthermore, the performance of the heat rejection system affects the performance of the steam turbine, impacting turbine efficiency. At the SSU6 project site, evaporative cooling would be considerably more effective than the air-cooled condenser, resulting in higher steam turbine efficiency.

In conclusion, due to the renewable energy source available, the generating equipment (triple-pressure steam turbine) and evaporative cooling, energy consumed by the project would not create significant adverse effects on energy supplies or resources, nor would it require additional sources of energy supply or consume energy in a wasteful or inefficient manner.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, will not influence, nor will it be influenced by, project efficiency. Any efficiency impacts due to closure of the project would be on the electric system as a whole. Yet the vast size of the electric system serving California, the number of generating plants offering to sell power into it, and the existence of the California Independent System Operator to ensure the efficient management of the system, all lend assurance that closure of this facility will not produce significant adverse impacts on efficiency.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate 185 MW (nominal net output) of electric power using the most efficient generating technology currently

available for geothermal power projects. In addition, employment of the proposed evaporative heat rejection system instead of an air-cooled system proves to be most suitable due to the enhanced turbine efficiency and the availability of condensed geothermal steam.

The project would decrease reliance on natural gas and oil, and would increase reliance on renewable energy resources. As proposed, the SSU6 would consume substantial amounts of energy. However, since it would consume a renewable resource and would employ the most efficient generating technology and heat rejection system available, it would not create significant adverse effects on energy supplies or resources, nor would it require additional sources of energy supply or consume energy in a wasteful or inefficient manner. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

No energy standards apply to the project. Facility closure would not likely present significant impacts on electric system efficiency.

From the standpoint of efficiency, staff believes the SSU6 can be certified. No Conditions of Certification are proposed.

REFERENCES

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POWER PLANT RELIABILITY

Shahab Khoshmashrab

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see **Setting** below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While CE Obsidian Energy, LLC (applicant) has predicted a 95 percent or higher availability for the Salton Sea Unit 6 Project (SSU6) (see below), staff uses the benchmark identified above, rather than the applicant's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Presently, there are no laws, ordinances, regulations or standards (LORS) that establish either power plant reliability criteria or procedures for attaining reliable operation. However, the commission must make findings as to the manner in which the project is to be designed, sited and operated to ensure safe and reliable operation (Cal. Code Regs., tit. 20, § 1752(c)). Staff takes the approach that a project's reliability is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system (see **Setting** below).

SETTING

In the regulated monopoly electric industry of past decades, the utility companies assured overall system reliability, in part, by maintaining a "reserve margin." This amounted to having on call, at all times, sufficient generating capacity, in the form of standby power plants, to quickly handle unexpected outages of generating or transmission facilities. The utilities generally maintained a 7- to 10-percent reserve margin, meaning that sufficient capacity was on call to quickly replace from 7 to 10 percent of total system resources. This margin proved adequate, in part because of the reliability of the power plants that constituted the system.

Now, in the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (CalSO), an entity that purchases, dispatches and sells electric power throughout the state. How CalSO will ensure system reliability is still being determined; protocols are being developed and put in place that will, it is anticipated, allow sufficient reliability to be maintained under the competitive market system. “Must-run” power purchase agreements and “participating generator” agreements are two mechanisms being employed to ensure an adequate supply of reliable power.

The CalSO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes (CalSO 2002);
- describing all remedial actions taken during any outages (CalSO 2002); and
- scheduling all planned maintenance outages with the CalSO.

The CalSO’s mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants exhibit individual reliability sufficiently lower than this historical level, the assumptions used by CalSO to ensure system reliability will prove invalid, with potentially disappointing results. On November 29, 2001, the CalSO Board of Directors determined to pursue a program to establish and enforce power plant maintenance standards (McCorkle 2001).

Until the restructured competitive electric power system has undergone a shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff deems it wise to encourage power plant owners to continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

The applicant proposes to operate the 185 MW (nominal net output) SSU6, selling energy and capacity to the Imperial Irrigation District (IID) and to the power market (CEOE 2002a, AFC § 1.2). The project is expected to operate at an overall availability of 95 percent or higher (CEOE 2002a, AFC §§ 4.1, 6.2.3.1).

ANALYSIS

The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant reliability are based on its actual ability to generate power when it is considered available, and are based on starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when

called upon to operate. Throughout its intended 30-year life (CEOE 2002a, AFC §§ 3.5.1, 4.1.1), the SSU6 will be expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the SSU6 will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

The applicant describes a QA/QC program (CEOE 2002a, AFC § 4.2.7) typical of the power industry. Equipment would be purchased from qualified suppliers, based on technical and commercial evaluations. The project would maintain a record of documents for review and reference including vendor instruction manuals; design calculations and drawings; quality assurance reports; inspection and equipment testing records; conformed construction drawings and records; procurement specifications; and purchase orders and correspondence. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility called on to operate in baseload service for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the project (CEOE 2002a, AFC § 4.2; Appendix F). The standard and low-pressure crystallizer trains will be redundant, allowing full plant output to be maintained when one of the trains is taken out of service (CEOE 2002a, AFC § 4.2.1). Redundancy will be provided in the steam turbine subsystems where practical (CEOE 2002a, AFC § 4.2.2). Further, the plant's distributed control system (DCS) will be fully redundant with automatic tracking and switchover capability in case of primary microprocessor failure. Four 33 percent parallel ejector trains featured in the gas removal system will be available, allowing one train to be isolated for maintenance while maintaining plant operation at full capacity with the other three trains. Enough wells will be drilled to provide production and injection capacity so that full plant output can be maintained while wells are being individually

worked over (CEOE 2002a, AFC § 4.2.1). The plant instrument air system will be equipped with redundant systems. Other balance of plant equipment will be provided with redundant examples (CEOE 2002a, AFC § 4.2; Appendix F), thus:

- two 100-percent air compressors;
- two 100-percent condensate pumps;
- three 50-percent vertical circulating water pumps per cooling tower; and
- two 100-percent blow down pumps;

With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy would be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a plant maintenance program typical of the industry (CEOE 2002a, AFC § 4.2.8). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. **The program would encompass both preventive and predictive maintenance techniques. Maintenance outages would be planned for periods of low electricity demand.** In light of these plans, staff expects that the project would be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

According to the State Department of Commerce, Division of Oil, Gas and Geothermal Resources (DOGGR), the Salton Sea Geothermal Field is believed to supply sufficient resources in commercial quantities for the life of the SSU6 (DOGGR 2002).

Water Supply Reliability

The SSU6 would be designed to be self-sufficient with regard to water supply to the greatest extent practical (CEOE 2002a, AFC §§ 5.4.1.1, 3.3.4.2). Water produced from the condensate steam in the power cycle would supply the needed makeup water for the plant's heat rejection system. Additionally, this condensate would supply much of the water necessary to decrease the concentration of brine for ease of re-injection. This water would constitute over 95 percent of the facility's water need. Fresh water from the IID canal system would provide the balance. For further discussion of water supply, see **Soil and Water Resources**.

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds and tsunamis (tidal waves) will not likely represent a hazard for this project, but flooding,

seismic shaking (earthquake) and seiches (waves in inland bodies of water) present credible threats to reliable operation.

Flooding

Site elevation ranges from 232 feet below mean sea level to 227 feet below mean sea level. The site is within the 100-year flood plain. To mitigate the flood hazard, the applicant plans to construct a berm around the entire facility with a top of berm elevation of –220 feet. The applicant also proposes to design the drainage plan for the project site to prevent flooding of the facilities by a 100-year, 24 hour storm event, in accordance with the Imperial County Flood Control requirements (CEOE 2002a, AFC §§ 4.3.1.2, 5.2.1, 5.4.4.1). In light of compliance with the flood control requirements and the mitigation measures proposed by the applicant, staff believes that concerns with the power plant functional reliability due to flooding events will be mitigated to less than significant. For further discussion, see **Water Resources**.

Seismic Shaking

The site lies within Seismic Zone 4 (CEOE 2002a, AFC § 4.3.1.1); see **Geology and Paleontology**. The project would be designed and constructed to the latest appropriate LORS (CEOE 2002a, AFC § 5.2.4; Appendix B). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, because these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, older existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no real concern that power plant reliability will affect the electric system's reliability due to seismic events.

Seiches

A wave created by earthquake shaking in an enclosed body of water is called a seiche. The possibility may exist for a seiche to occur in the Salton Sea; see **Geology and Paleontology**. The proposed site is situated nearly at the Salton Sea level and approximately 1,000 feet southeast of the Salton Sea. Therefore, it is possible for flooding from a seiche to effect the site. However, there are no records of seiches occurring during recent earthquakes in the Imperial Valley. Because of the applicant's proposal to mitigate the possible impact of a seiche, such as raising the embankment height along the western side of the site and/or ground improvement (CEOE 2002a, AFC §§ 5.2.1.4.5, 5.2.4.4), staff believes that concerns with the power plant functional reliability due to seiches events will be mitigated to less than significant.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet (<http://www.nerc.com>). NERC

reports the following summary generating unit statistics for the years 1996 through 2000 (NERC 2001):

For Geothermal units (All MW sizes)

Availability Factor = 91.00 percent

The triple-pressure, condensing steam turbine technology that is planned for the project has been on the market for many years now, and can be expected to exhibit typically high availability. The brine handling and treatment technology to be employed in the SSU6 has been under development by CEOE and its predecessors for several decades, and has proven reliable. In light of this, the applicant's prediction of an annual availability factor of 95 percent or higher (CEOE 2002a, AFC §§ 4.1, 6.2.3.1) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these new machines can well be expected to outperform the fleet of various (mostly older) steam turbines that make up the NERC statistics.

Technological advancements, as well as redundancy as illustrated above, have led to extremely high reliability for the steam turbine considered for this project. Much maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability therefore appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant are in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, cannot impact power plant reliability. Reliability impacts on the electric system from facility closure, should there be any, are dealt with in **Transmission System Engineering**.

CONCLUSIONS AND RECOMMENDATION

The applicant predicts an equivalent availability factor of 95 percent or higher, which staff believes is achievable in light of the industry norm of 91 percent for this type of plant.

The geothermal technology chosen for the project would provide a reliable power source for Imperial County and California.

Based on a review of this proposal, staff concludes that the plant will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No Conditions of Certification are proposed.

REFERENCES

CalSO (California Independent System Operator) 2002. "Forced Outage Reporting Requirements", CalSO web site, posted on August 14, 2002.

CEOE (CE Obsidian Energy, LLC, Calipatria, California) 2002a. Application for Certification for Salton Sea Unit 6, Geothermal Power Plant Project Volumes I & 2. July 26, 2002.

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TRANSMISSION SYSTEM ENGINEERING

Sudath Arachchige, Demy Bucaneg -PE and Al McCuen

SUMMARY OF CONCLUSIONS

Staff concludes that the proposed Salton Sea Unit 6 Project (SSU6) switchyard, outlet lines, and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). These conclusions are contingent on the following assumptions: (1) that the adjacent Utilities, namely WAPA, SCE, APS and SDG&E, confirm the acceptability of the System Impact Study (SIS) and the identified mitigation measures; and, (2) that the proposed conditions of certification TSE-1 through TSE-8 are implemented. No additional new transmission facilities, other than those proposed by the applicant, are required for the interconnection of the 200 MW Salton Sea Unit 6 Project (SSU6).

INTRODUCTION

The Transmission System Engineering (TSE) analysis provides the basis for the findings in the Energy Commission's Decision. The Preliminary Staff Assessment (PSA) indicates whether or not the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations, and standards (LORS) required for safe and reliable electric power transmission. The analysis also assesses whether or not the Applicant has accurately identified all interconnection facilities required for the addition of the project to the electric grid.

Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the Applicant. Staff's analysis provides proposed conditions of certification to ensure the project complies with applicable LORS during the design review, construction, operation and potential closure of the project.

Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effect of construction and operation of any new or modified transmission facilities required for the project's interconnection to the electric grid and also beyond the project's interconnection with the existing transmission system that are required or are a reasonably foreseeable consequence of the power plant addition to the California transmission system. The interconnection of the project may result in the need to upgrade the breaker capacity of the Coachella Valley substation, to install remedial action scheme (RAS) and to upgrade transformer within the Imperial Irrigation District (IID) power system due to power flow increase.

CE Obsidian Energy (Applicant) filed an Application for Certification (AFC) to the California Energy Commission to construct a nominal 200 MW geothermal power plant in Imperial County, California. The Applicant proposes to connect their project, Salton Sea Unit 6 Project (SSU6), through a 16/161kV step up transformer in the SSU6 switchyard. The SSU6 switchyard would tie into the Imperial Irrigation District (IID)

transmission system via two 161kV single circuits. One of the proposed 161kV circuit would connect to the new IID Bannister Switching Station. The existing 161kV “L” line would loop in and out through the IID Bannister Switching Station. The other 161kV circuit would connect to the IID Midway Substation. In case both segments of the “L” line is out of service, the 14-mile 161kV circuit that terminates at the Midway substation would serve as an additional interconnection. The project is expected to be on line by the first quarter of 2005. (SSU6 2002-Volume 1,AFC section 1.2)

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), "Rules for Overhead Electric Line Construction," formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance, operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), "Rules for Construction of Underground Electric Supply and Communications Systems," formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code covers basic provisions for safeguarding of persons from hazards arising from the installation, operation, or maintenance of 1) conductors and equipment in electric supply stations, and 2) overhead and underground electric supply and communications lines. Its rules cover supply and communication lines, equipment, and associated work practices employed by a public or private electric supply, communications, railway, or similar utility in the exercise of its function as a utility. They cover similar systems under the control of qualified persons, such as those associated with an industrial complex or utility interactive system (NESC C2-1997).
- North American Reliability Council (NERC)/Western Electricity Coordinating Council (WECC) Planning Standards merge the WECC Planning Standards into the NERC Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards. These standards allow to plan electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, "NERC/WECC Planning Standards with Table I and WECC Disturbance-Performance Table" and on Section I.D, "NERC/WECC Standards for Voltage Support and Reactive Power". These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal

loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) and to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines in a right of way and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC August 9, 2002).

- California ISO (Cal-ISO) Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the Cal-ISO transmission grid facilities. The Cal-ISO Grid Planning Standards incorporate the NERC/WECC Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to NERC/WECC Planning Standards for Transmission Systems Contingency Performance. However, the Cal-ISO Standards also provide some additional requirements that are not found in the NERC/WECC Planning Standards. The Cal-ISO Standards apply to all participating transmission owners interconnecting to the Cal-ISO controlled grid. It also applies when there are any impacts to the Cal-ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the Cal-ISO (California ISO February 7, 2002).

EXISTING FACILITIES AND RELATED SYSTEMS

The proposed SSU6 facility is bounded by five existing substation facilities namely El Centro Switching Station (ECSS), Midway, Avenue 58 (Ave 58), Niland, and Coachella Valley Substations (Coachella). Existing transmission line facilities include:

- ECSS-Ave 58 161kV “L” Line
- ECSS-Midway 161kV “M” Line
- Ave 58-Coachella 161kV Line
- Midway-Niland 161kV Line
- Niland-Coachella 161kV “N” Line
- Midway-Coachella 230kV “KN” and “KS” Lines

The above substation and transmission line facilities are owned and operated by IID. ECSS connects to San Diego Gas & Electric (SDG&E) at the Imperial Valley Substation through the 230kV “S” Line. Southern California Edison (SCE) ties with the IID System at two points:

- SCE’s Devers Substation via Coachella-Devers 230kV “KN” Line; and,
- SCE’s Mirage Substation via Coachella-Ramon 230kV Line and Ramon-Mirage 230kV Line.

The Arizona Power Service (APS) and IID interties at the Yucca Substation. The Western Area Power Authority (WAPA) interconnects with IID at Blythe Station and Knob Substation respectively (Pre-SSU6 Project, 2005 IID System Configuration Map).

PROJECT DESCRIPTION

The SSU6 is composed of a Resource Production Facility (RPF), a Power Generation Facility (PGF), and ancillary facilities. The PGF consists of one geothermal power block, including a condensing turbine/generator set, the gas removal and abatement systems, and the heat rejection system. The PGF also includes a 161kV switchyard and several power distribution centers. The turbine/generator will be nominally rated at 200MW with a net plant capacity of 185MW. The Applicant has proposed two points of interconnection for the SSU6 project at the ECSS-Ave 58 161kV “L” Line through the new Bannister Substation and at the Midway Substation.

SWITCHYARD FACILITIES

The 16kV totally enclosed water and air-cooled synchronous-type generator will produce power from the SSU6 project. The output of the steam turbine generator (STG) is connected, through a 9400A STG circuit breaker, by isolated phase bus to a bus-to-cable transition compartment and to a two-winding, oil-filled, 16kV-to-161kV STG main step-up transformer. The transition compartment connects two 16kV-to-4.16kV auxiliary transformers that will provide plant power. 25kV cables will be installed in underground duct banks. The high-voltage bushings of the STG main step-up transformer will be connected to the 161kV bus. Surge arresters and the Utility metering unit will be installed between the STG main step-up transformer and the 161kV bus. Two 1200A-circuit breakers will be tapped to the 161kV bus for transmission line supplies to the Midway Substation and to the new Bannister Substation.

From the 161kV bus, the STG main step-up transformer does not have a circuit breaker or a disconnect switch. In the event of a transformer fault, the two 1200A-circuit breakers will trip and open the 161kV Midway-SSU6-Bannister Line. The SSU6 switchyard configuration should be checked by the Applicant to determine if a method to isolate a fault is cost effective.

TRANSMISSION FACILITIES

The SSU6 switchyard will interface to IID grid via two 161kV single circuits. The interconnection facilities include the proposed 16-mile single circuit interconnection at the ECSS-Ave 58 161kV “L” Line through the new Bannister Substation and the proposed 15-mile single circuit interconnection at the Midway Substation. The existing Midway Substation will be modified to a three-circuit breaker ring bus feeding ECSS, Niland and the SSU6 switchyard. The new Bannister Substation will have a three-circuit breaker ring bus that will feed ECSS, Ave 58 and the SSU6 switchyard. A double circuit line will be constructed from the “L” Line taps to the new Bannister Substation. The transmission facility configuration is in accordance with good utility practices and is considered acceptable.

ANALYSIS AND IMPACTS

SYSTEM RELIABILITY

A System Impact Study (SIS) for connecting a new power plant to the existing power system grid is performed to determine the alternate and preferred interconnection

facilities to the grid, downstream transmission system impacts and their mitigation measures. SIS is conducted in conformance with system performance levels as required in Utility reliability criteria, NERC/WECC and Cal-ISO planning standards. The study determines the reliability criteria violations and will be the basis for identifying the mitigation measures. The study is conducted with and without the SSU6 project and its interconnection facilities for the year the project will come on-line. The study normally includes a Load Flow study, Transient Stability study, Post-transient Load Flow study and Short Circuit study. The study must be conducted under the normal condition (N-0) of the system and for all credible contingency/emergency conditions, which includes the loss of a single system element (N-1) and the simultaneous loss of two system elements (N-2). The study may also be conducted for credible simultaneous loss of multiple system elements. In addition to the above analysis, the studies may be performed to verify whether sufficient active or reactive power margins are available in the area system or area sub-system to which the SSU6 project will be interconnected.

Any new transmission facilities such as the power plant switchyard, the outlet line, and downstream facilities required for reliably connecting a project to the grid are considered part of the project and are subject to the Application for Certification review process.

Scope of System Impact Study (SIS)

The study was performed by IID at the request of the CE Obsidian Energy to identify the transmission system impacts caused by the SSU6 project on the IID's 161kV system and the systems of the SCE, WAPA, APS and SDG&E. The SIS included a Power Flow Study, Short Circuit Study, and Dynamic Stability Analysis (SSU6 2002, System Impact Study). The study modeled the proposed SSU6 for a net output of 185MW. The base cases included all approved IID, SCE, WAPA, APS and SDG&E projects, major transmission system path flows, and the proposed queue generation projects before the on-line date of the SSU6 project. The detailed study assumptions are described in the SIS (IID SIS Volume-1 dated May 2002 and IID SIS Sensitivity Cases dated December 2002). The Power Flow studies were conducted with and without the SSU6 connected to the IID grid at the Bannister switching station and Midway substation using 2005 Heavy Summer base case under normal (N-0), Cal-ISO Category B (N-1) and Category C (N-2) contingency conditions. The Power Flow study assessed the project's impact on thermal loading of the transmission lines and equipment. Dynamic stability studies were conducted with the SSU6 using the 2005 Heavy Summer base case to determine whether the SSU6 would create instability in the system following certain selected outages. Short circuit studies were conducted with and without the SSU6 to determine if the SSU6 would result in overstressing existing substation facilities.

Power Flow Study Results

SIS showed pre-existing overloads in the SCE, APS, SDG&E, and IID power systems. The overloading problems affect transformer and transmission line facilities under N-1 and N-2 conditions. The Applicant proposed the installation of remedial action scheme (RAS) to mitigate the pre-existing conditions on the IID power systems only. Mitigation measures have not been identified for the affected facilities in SCE, APS, and SDG&E. Staff has requested the Applicant to coordinate with the adjacent Utilities to verify the SIS and to identify/accept the mitigation measures (Data Request dated November 2002 and Email dated January 2003).

Assuming that the pre-existing conditions were corrected, the post-project studies identified three minor conditions that require mitigation to allow SSU6 interconnection to the IID transmission system. Based on the SIS results, there are no adverse impacts under normal conditions of the network due to interconnection of SSU6. Below are the study results and mitigation measures based on normal conditions and contingency analysis.

Normal (N-0) Conditions

- The SIS results indicated that no overloads would occur under N-0 conditions in any of the seven base cases studied. The addition of the SSU6 project does not have negative thermal impact on the system under N-0 condition.

Contingency N-1/Cal-Iso Category B Conditions

- At the Midway Substation, the outage of the 230/92kV Transformer #1 overloads Transformer #2 by approximately 41% and vice versa.
- The outage of the 161/92kV Transformer in Avenue 58 Substation overloads the 161/92kV Transformer #3 at the Coachella Valley Substation by approximately 9%.

Contingency N-2/Cal-Iso Category C Conditions

- The outage of both ECSS-Bannister and ECSS-Midway 161kV Lines overloads the 161/92kV Transformer #1 in Niland Substation by approximately 45% at the worst case scenario.
- The outage of both ECSS-Bannister and Midway-SSU6 161kV Lines overloads the 161/92kV Transformer #1 in Avenue 58 Substation by approximately 24% at the worst case scenario. Same outage creates overload problems in the Bannister-Ave 58 161kV Line by approximately 10%.
- The tripping of both Coachella-Devers and Ramon-Mirage 230kV Transmission Lines overloads the Blythe-Blythe SC 161kV Line by approximately 2%.
- The tripping of both Coachella-Devers and Devers-Mirage 230kV Transmission Lines overloads the 230/115kV Transformer #1 in Mirage Substation by approximately 7%.
- Outage of the Ave 58-Bannister and Midway-SSU6 161kV Lines overloads the ECSS-Bannister 161kV Line by approximately 8%.
- Outage of the Coachella-Midway 230kV Lines 1 and 2 overloads the Earthe2-Reg1ex 92kV Line by approximately 57%.
- Outage of the Coachella-Devers and Coachella-Ramon 230kV Transmission Lines overloads the 230/92kV Transformer #1 at Ramon Substation by approximately 4%.

Mitigation

The following mitigation measures were identified for the impacts described herein.

- At Avenue 58 Substation: replace the 161/92kV, 125 MVA transformer with a 225MVA transformer.

- At Niland Substation: replace the 161/92kV, 75MVA transformer with the Avenue 58 125 MVA transformer.
- At Coachella Valley Substation: install a parallel 161/92kV, 125 MVA transformer with the existing 161/92kV transformer, 125 MVA transformer.
- For the Bannister-Ave 58 and ECSS-Bannister 161kV Lines: reduce SSU6 generation to approximately 170MW.
- At Ramon Substation: install RAS to trip generation at the IID collector system.
- For the Earthe2-Reg1ex 92kV Line: install RAS to trip generation at IID collector system.
- In addition to the above mitigation plan, the possibility for the requirement of an operating procedure was identified under the unlikely contingency of losing both the 161kV line from the project to IID's Midway substation, and either the 161kV line from the project to the El Centro Switching Station or to the Avenue 58 substation at the time of extreme hot weather conditions.

The Applicant should coordinate with the adjacent Utilities to identify mitigation measures involving the overloads in the Blythe-Blythe SC 161kV Line and in the 230/115kV Transformer #1 at Mirage Substation. These overloads are enumerated in the "Contingency N-2/Cal-ISO Category C Conditions" above.

The proposed mitigation measures for the pre-existing conditions involve the installation of RAS to trip generation from the IID System and the reduction of generation from the Blythe Energy Project. Assuming that the pre-existing conditions are corrected, it is concluded that adding the SSU6 project does not have a negative thermal impact on the system under category B and C contingency conditions. The SSU6 will deliver power to the IID system through contractual agreements thus minimizing any significant impact on external system. The identified transformers above are within the fencelines of the respective substations and would not create significant environmental impacts.

Transient Stability Study Results

Dynamic Stability studies were conducted by SSU6 using 2005 Heavy Summer base case to determine if the SSU6 would create any adverse impact on the stable operation of the transmission grid following selected Cal-ISO category B (N-1) & C (N-2) outages (SSU6-2002, SIS). The results indicate there are no identified transient stability concerns on the transmission system following the selected disturbances, as outlined in the SIS for integration of the SSU6.

Post-Transient Power Flow Study Results

In the IID May 2002 SIS, the IID 230kV, 161kV and 92kV were analyzed, Q-V curves were generated for every bus for the 230kV Ramon to Mirage line outage. No voltage problems were identified in the post transient voltage analysis that deviation of 5% or greater occur. Therefore no post-transient studies were undertaken in the IID December 2002 SIS and Staff concurs.

Short Circuit Study Results

Short circuit studies were performed to determine the degree to which the addition of the SSU6 project increases fault duties at the IID's substations, adjacent utility substations, and the other 161-kV and 230-kV busses within the study area. The busses at which faults were simulated, the maximum three phase and single line to ground fault currents at these busses both without and with the SSU6 project, and information on the breaker duties at each location are summarized in the table below (Section-5.2, SSU6-AFC-2002).

The short circuit fault duty analysis at Coachella Valley Substation identified three 92kV breakers at 92.8% of their maximum interrupting rating in the pre-project base case and 93.6% of their maximum interrupting rating in the post-project base case. The calculated maximum short circuit current is below the short circuit interrupting rating of the cited circuit breakers. However, the Applicant recommended replacement of three circuit breakers at the Coachella Valley Substation as identified in the tabulation. The circuit breakers are within the fenceline and would not create significant environmental impacts.

| Substation | Breaker | kV | Short Circuit Interrupting Rating | Pre-project Short Circuit | Post project Short Circuit |
|------------------|---------|----|-----------------------------------|---------------------------|----------------------------|
| Coachella Valley | X10 | 92 | 20000 | 18563 | 18715 |
| | CLNO | 92 | 20000 | 18563 | 18715 |
| | CXSO | 92 | 20000 | 18563 | 18715 |

COMPLIANCE WITH LORS

The SIS complies with the NERC/WSCC, Cal-ISO and NERC planning Standards and reliability criteria assuming that the SIS was coordinated with and accepted by the adjacent Utilities. Staff is still awaiting the confirmation of the SIS and the identified mitigation measures from WAPA, SCE, SDG&E and APS.

The proposed SSU6 project incorporates transmission lines, substation, switchyard and power plant facilities involving underground and overhead installation. The applicant will design, build and/or operate the proposed facilities according the provisions of the GO 95 and 128 or the NESC, Title 8, CEC, applicable interconnection and related industry standards. Assuming the recommended Conditions of Certification are implemented, Staff concludes that the SSU6 project will meet the requirements of all applicable LORS.

FACILITY CLOSURE

Planned closure occurs in a planned and orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances, the owner is required to provide a closure plan 12 months prior to closure, which in conjunction with applicable LORS, is considered sufficient to provide adequately for safety and reliability. For instance, a planned closure provides time for the owner to coordinate with the Transmission Owner (TO), in this case the IID, to assure that the TO's system will not be closed into the outlet thus energizing the project Substation. Alternatively, the owner may coordinate with the TO to maintain some power service via the outlet line to supply critical station service equipment or other loads.

Unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishing an on-site contingency plan (TSE-5, f) ii. Executed Facility Interconnection Agreement).

Unexpected permanent closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. An on-site contingency plan, that is in place and approved by the Energy Commission's Compliance Project Manager (CPM) prior to the beginning of commercial operation of the facilities, will be developed to assure safety and reliability (TSE-5, f) ii. Executed Facility Interconnection Agreement).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE discipline have been received.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Assuming that pre-existing, as explained earlier, overload conditions are corrected and the adjacent Utilities accept the SIS and the proposed post-SSU6 mitigation measures, Staff concludes as follows:

1. The load flow analysis identifies no overloading, voltage drop violation or generation congestion. The stability studies indicated that the SSU6 project has no adverse impact on system stability.
2. Post transient analysis identified no voltage criteria violation.
3. The three-phase short circuit duty analysis indicated that the SSU6 project marginally increases the pre-project short circuit duty but still under the breaker interrupting capacity.

4. The addition of SSU6 and related transmission lines will increase operator flexibility during steady state and contingency conditions.

RECOMMENDATIONS

Staff needs verification of the SIS assumptions, sensitivity cases, power flow analysis and the proposed mitigation measures from WAPA, SCE, APS and SDG&E. This is to confirm acceptability by the adjacent Utilities. Without the acceptance by the adjacent Utilities, the following Conditions of Certification are for discussion purposes only.

CONDITIONS OF CERTIFICATION FOR TSE

TSE-1 The project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for equipment (see a list of major equipment in **Table 1: Major Equipment** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Table 1: Major Equipment

| DESCRIPTION |
|-----------------------------|
| Breakers |
| Power House 12.5 kV |
| Switchyards 12.5 kV |
| Buses |
| Underground cables |
| Disconnects |
| Take off facilities |
| Overhead lines |
| Switchyard control building |
| Step-up transformer |
| Others |

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in

the design of power plant structures and equipment supports; or D) a mechanical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.]

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes; if site conditions are unsafe or do not conform to predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

- i. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and
- ii. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 The project owner shall keep the CBO informed regarding the status of engineering design and construction. If any discrepancy in design and/or construction is discovered, the project owner shall document the discrepancy and recommend the corrective action required. The discrepancy documentation shall

become a controlled document and shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification.

Verification: The project owner shall submit monthly construction progress reports to the CBO and CPM to be included in response to **TSE-3**. The project owner shall transmit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

- a) receipt or delay of major electrical equipment;
- b) testing or energizing of major electrical equipment; and
- c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The substitution of Compliance Project Manager (CPM) and CBO approved "equivalent" equipment and equivalent substation configurations is acceptable. The project owner shall submit the required number of copies of the design drawings and calculations as determined by the CBO.

- a) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", National Electric Safety Code (NEC) and related industry standards.
- b) Breakers and buses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

- c) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.
- d) Termination facilities shall comply with CPUC Rule 21 and applicable interconnection standards.
- e) The isolated phase bus shall be sized to accommodate the nominal output of 200MW.
- f) The project owner shall provide:
 - i. The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Remedial Action Scheme (RAS) sequencing and timing if applicable,
 - ii. Executed Facility Interconnection Agreement.

Verification: At least 60 days prior to the start of construction of transmission facilities, the project owner shall submit to the CBO for approval:

Design drawings, specifications and calculations conforming with CPUC General Order (GO) 95 or NESC, Title 8, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", NEC, CPUC Rule 21, CPUC GO-128, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, underground cables, grounding systems and major switchyard equipment.

For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"² and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", NEC, CPUC Rule 21, CPUC GO-128 applicable interconnection standards, and related industry standards.

Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** a) through f) above.

The Facilities Study and signed letter from the applicant stating that mitigation is acceptable shall be provided concurrently to the CPM and CBO. Substitution of equipment and substation configurations shall be identified and justified by the project owner for CBO approval.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes, which may not conform to the requirements **TSE-5** a) through f), and have not received CPM and CBO approval, and request approval to implement such changes. A detailed description of the proposed change and complete

² Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

Verification: At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes which may not conform to requirements of **TSE-5** and request approval to implement such changes.

TSE-7 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, CPUC GO-128, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

"As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", CPUC GO-128, CPUC Rule 21, and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in responsible charge.

TSE-8 The applicant shall provide the following Notice to the California Independent System Operator (Cal-ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one (1) week prior to synchronizing the facility with the grid for testing, provide the Cal-ISO a letter stating the proposed date of synchronization; and
2. At least one (1) business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 to 1530 at (916)-351-2300.

Verification: The applicant shall provide copies of the Cal-ISO letter to the CPM when it is sent to the Cal-ISO one (1) week prior to initial synchronization with the grid. A report of conversation with the Cal-ISO shall be provided electronically to the CPM one (1) day before synchronizing the facility with the California transmission system for the first time.

REFERENCES

Cal-ISO (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

Cal-ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol posted April 1998.

Cal-ISO (California Independent System Operator). 2002a. Cal-ISO Grid Planning Standards, February 2002.

IID (Imperial Irrigation District) 2002, Imperial Irrigation District System Impact Study submitted to the California Energy Commission.

NERC/WECC (North American Reliability Council /Western Electricity Coordinating Council), 2002. NERC/WSCC Planning Standards, August 2002.

DEFINITION OF TERMS

| | |
|-----------------------|--|
| AAC | All Aluminum conductor. |
| ACSR | Aluminum Conductor Steel-Reinforced. |
| SSAC | Steel-Supported Aluminum Conductor. |
| Ampacity | Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations. |
| Ampere | The unit of current flowing in a conductor. |
| Bundled | Two wires, 18 inches apart. |
| Bus | Conductors that serve as a common connection for two or more circuits. |
| Conductor | The part of the transmission line (the wire) that carries the current. |
| Congestion Management | Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria. |
| Emergency Overload | See Single Contingency. This is also called an L-1. |
| Kcmil or KCM | Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained. |

| | |
|-----------------------------------|--|
| Kilovolt (kV) | A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground. |
| Loop | An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac. |
| Megavar | One megavolt ampere reactive. |
| Megavars | Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. |
| Megavolt ampere (MVA) | A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000. |
| Megawatt (MW) | A unit of power equivalent to 1,341 horsepower. |
| Normal Operation/ Normal Overload | When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating. |
| N-1 Condition | See Single Contingency. |
| Outlet | Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid. |
| Power Flow Analysis | A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels. |
| Reactive Power | Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system. |
| Remedial Action Scheme (RAS) | A remedial action scheme is an automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload. |
| SF6 | Sulfur hexafluoride is an insulating medium. |
| Single Contingency | Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service. |
| Solid dielectric cable | Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket. |
| Switchyard | A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators. |
| Thermal rating | See ampacity. |
| TSE | Transmission System Engineering. |
| Tap | A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers |

at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing

A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild

A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Robert Worl

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed Salton Sea Unit 6 (SSU6) geothermal power project. The purpose of this alternatives analysis is to comply with California's environmental laws by providing an analysis of a reasonable range of feasible alternatives that could reduce or avoid any potentially significant adverse impacts of the proposed project (Cal. Code Regs., tit. 14, §15126.6; Cal. Code Regs., tit. 20, §1765). In the Air Quality, Biological Resources, and Visual Resources sections of this Preliminary Staff Assessment, staff has identified potentially significant impacts of the proposed project. In this Alternatives analysis, staff has analyzed different technologies and alternative sites that may reduce or avoid significant impacts. Staff also analyzed the impacts that may be created by locating the project at alternative sites.

The purpose of staff's alternatives analysis is to provide a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project. To accomplish this, staff must determine the appropriate scope of analysis. Consequently, it is necessary to identify and determine the potentially significant impacts of the proposed project and then focus on alternatives that are capable of reducing or avoiding the significant impacts of the proposed project. To prepare this alternatives analysis, staff:

- identified the basic objectives of the project, provided an overview of the project, and described its potentially significant adverse impacts;
- identified and evaluated alternative sites (whether the alternative site mitigates the identified impacts of the proposed project and whether the alternative site creates impacts of its own);
- identified and evaluated technology alternatives to the project, including conservation and other renewable sources; and
- evaluated the impacts of not constructing the project, known as the No Project Alternative under CEQA.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulations Section 15126.6(a), provide direction by requiring an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the No Project Alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

The range of alternatives is governed by the "rule of reason" which requires consideration only of those alternatives necessary to permit informed decision-making

and public participation. The California Environmental Quality Act (CEQA) states that an environmental document does not have to consider an alternative if its effect cannot be reasonably ascertained and if its implementation is remote and speculative (Cal. Code Regs., tit. 14, §15125(d)(5)). However, if the range of alternatives is defined too narrowly, the analysis may be inadequate (City of Santee v. County of San Diego (4th Dist. 1989) 214 Cal. App. 3d 1438).

SITE SELECTION AND PROJECT OBJECTIVES

The site selection criteria listed below were used by the applicant for choosing the proposed site. However, staff does not necessarily concur with all the criteria. The project objectives, as determined by staff, are listed in the following section. According to the AFC, the applicant chose the proposed site for the following reasons (CEOE, § 3.2.2, pps. 3-3 to 3-5. 2002a):

- The proposed area has proven geothermal reserves;
- the location allows a well field and plant site layout providing the necessary energy production using available acreage, at the closest well spacing possible without undue interference between wells, while sustaining production over the life of the project;
- the location allows taking advantage of the blind fault that bisects the Salton Sea geothermal field, allowing hot brine to be extracted northwest of the fault, while cooled spent brine is reinjected south of the fault without impacting the hotter production zone, and utilizing the minimal spacing between wells supporting the project;
- the location would develop the remaining acreage on the shallow western end of the field that is still on land, between the developed part of the field and the hotter part of the field under the Salton Sea, currently inaccessible but providing pressure support for the developed part of the field;
- this portion of the main blind fault is considered a sealing fault or diffusion boundary;
- this location allows well placement that insures production for the life of the project without interfering with the production at other operating geothermal plants;
- the project would be consistent with the A-3-G (heavy agriculture with a geothermal overlay) existing and planned land uses.

Based on analysis of the SSU6 Application for Certification (AFC), the Energy Commission staff has determined the project's objectives as:

- complete development of the shallow, land-based western zone of the geothermal region currently occupied by power plants;
- generation of approximately 185 MW of load-serving capability in a location with access to Imperial Irrigation Districts (IID) electricity distribution infrastructure;
- location near a water source for dilution of reinjected brine;
- capacity to service the 20-year contract with IID for the provision of approximately 170 MW;

- commercial operation by approximately late 2005.

ANALYSIS OF ALTERNATIVE SITES

For SSU6 staff has determined that, based on information available at this time, significant hydrogen sulfide (H₂S) emissions, and significant emissions of ammonia, a PM₁₀ precursor, remain unmitigated. Potentially significant visual impacts to public views from the Rock Hill public area have been identified resulting from visual plumes. The Bureau of Land Management proposes to amend the California Desert Conservation Area Plan to allow a 2.8 mile transmission line corridor, and the U.S. Fish and Wildlife Service intends to initiate a Section 7 consultation of the entire SSU6 project due to the presence of at least two endangered species adjacent to the project area. The necessary Biological Assessment has not yet been accepted for initiating that consultation. All other potentially significant environmental impacts can be mitigated to a level of insignificance by implementation of mitigation measures identified in the PSA.

The following discussion includes an analysis of two alternative sites. Refer to **ALTERNATIVES Figure 1** for a map of these sites.

SCREENING CRITERIA USED TO SELECT SITE ALTERNATIVES

The following criteria were used to identify potential alternative sites:

1. the site should avoid or substantially lessen one or more of the potential significant effects of the project;
2. to meet reliability objectives, the site should have access to IID transmission lines accessing key load pockets, preferably through the L-line, and the Midway substation;
3. sufficient land is needed to construct and operate a geothermal generating facility of this size. The proposed power plant would require approximately 173 acres including a minimum 50-acre parcel of land for the main project site. Therefore, staff used approximately 50 acres as the minimum lot size needed to accommodate the facility; and
4. the site should be within a reasonable distance of reliable sources of geothermal brine, of sufficient volume and temperature, to supply the steam for a project of this size and an available water supply, and transmission interconnections.

**COMPARISON OF SITES
BASED ON PROJECT IMPACTS**

| | Site 1 | Site 2 |
|-------------------------------------|---|--|
| Air Quality | Same as proposed project | Potential impacts at Niland |
| Biological Resources | Increased buffer to sensitive habitat | Potential impacts not studied |
| Visual Resources | Reduced impacts at sensitive viewing area | Potential impacts not studied |
| Transmission Interconnection | Same | Considerable potential impacts that have not been studied; longer interconnection routes |
| Noise | Potential reduction of construction and operation noise impact to sensitive species | Possible reduction of sensitive species noise impacts |
| Land Use | Same | Site control, similar loss of agricultural lands |

SITE 1: ADJACENT AGRICULTURAL LAND

The adjacent property, also owned by the applicant, could possibly hold the proposed project. It is the other half of the 160-acre parcel that will be partially developed by the SSU6 project. This land is appropriately zoned, and will be partially impacted by proposed access roads, parking, lay-down area and transmission lines leaving SSU6. This location would have similar access to the geothermal layer proposed for development, would allow for use of the proposed wells, pads and electrical transmission routes, and the same fresh water supply.

In addition this location may be able to reduce the potential noise impact on the Wildlife Refuge-managed lands adjacent to and north of the proposed site, Yuma clapper rail habitat. The Alternate 1 site also may reduce impacts from steam plumes and project infrastructure to the visual assets seen from the Rock Hill view site discussed in the Visual Resources section of this PSA.

Access to infrastructure and geothermal resource, though similar does pose potential negative impacts upon the project. Location of geothermal plant infrastructure is dependent upon a number of factors, including some not evident from the surface. The current engineering of the site location was done to insure balance flow of brine from each off the production wells, minimizing the need for mechanical pressure balancing. In addition, for safety reasons, shorter and relatively balanced pipeline segments provide for more safety during planned and emergency shutdowns, protecting both the environment, and the plant equipment. The balancing of the current design can be seen by the location of the wells in relation to the proposed project site. Additionally, the bottom-hole locations of proposed wells are based on detailed geophysical testing and exploratory drilling. Moving the plant infrastructure even the approximate 1,200 feet

has potential impacts for drilling, well hole paths, pressure, and temperature of the produced resource.

SITE 2: CARBON DIOXIDE WELLS AND DRY ICE PLANT

The Salton Sea KGRA. It is approximately three miles south of the town of Niland, and is between the shore of the Salton Sea and State Highway 111. The site was developed in the 1950's as a dry-ice plant to take advantage of the large CO₂ source discovered during early geothermal exploration in the area. This site has potential advantages that include reduction of noise and visual impacts, and some air quality impacts to the Wildlife Refuge land, habitat, and visual resources. In addition, this site may reduce potential air quality impacts on Calipatria from H₂S and ammonia as well. While the site is a greater distance from the Wildlife Refuge, it is closer to the town of Niland, there are more residences in the vicinity than at the proposed project site. The distance between the Salton Sea and Highway 111 may have implications for scenic views from the highway.

The ownership of sufficient property to insure an appropriate project site is currently not known. Access to water for the project, transmission rights of way and suitable interconnection sites are also unknown, but would be longer than those proposed at the current SSU6 location. Geophysical exploration of the area lags behind that done at the current proposed site, and has the potential to prove significant disadvantages in terms of safety and siting of project infrastructure, well locations, pressure and temperature support, and suitable reduced-impact reinjection locations. This site would not utilize the known resources of the currently developed segment of the KGRA. Impacts to traffic and transportation could also increase as there are fewer access points, and distances to off-site disposal locations for both construction and operational materials are greater. Potential for impacting habitat of sensitive species is not known, including the potential for increased risk from transmission lines and noise. The location is near to land managed by the BLM.

ALTERNATIVE TRANSMISSION LINE ROUTE

Should the BLM choose not to allow the L-Line interconnection to cross the 2.8 mile section of federal lands, the alternative would a longer route, paralleling State Highway 86 (SH-86) north for approximately 7.5 miles. This would avoid the need for a BLM right-of-way, and avoid the need for amending the California Desert Conservation Act Plan. The line new line would connect at a point where SH-86 intersects the L-Line. This route is 4.7 miles longer and it would affect more property. This may result in increasing costs to the public as Imperial Irrigation District is a community-owned district with operating costs borne by those owners.

NO PROJECT ALTERNATIVE

The No Project Alternative under CEQA assumes that the SSU6 project is not constructed. In the CEQA analysis, the No Project Alternative is compared to the proposed project and determined to be superior, equivalent, or inferior to it. The CEQA Guidelines state that "the purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. §15126.6(i)).

Toward that end, the No Project analysis considers “existing conditions” and “what would be reasonably expected to occur in the foreseeable future if the project were not approved...” (§15126.6(e)(2)).

If the SSU6 facility were not constructed, the proposed site would continue to be leased for agricultural production. In addition, the site would continue to provide an undeveloped buffer as habitat for birds, and recreational land management of the adjacent Wildlife Refuge. Fresh water use for irrigating the agricultural land would continue to be higher than that needed to support the geothermal power plant, and would not be available to reduce the Imperial Valley use of Colorado River water. However, if the SSU6 project was not constructed, it would not contribute to California's electricity resources, add to the IID and the State of California's use of renewable energy, increase competition, and help form a more reliable electric system that meets the goals of the deregulated energy market. Due to market forces, the proposed facility may also serve to reduce reliance on gas-fired, non-renewable energy facilities. This supplanting of non-renewable resource use may not occur in the absence of the plant's construction.

ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

This section describes alternatives that did not satisfy the screening criteria for inclusion in the more detailed analysis presented above, and include the following:

- simple or combined-cycle gas-fired plant
- demand side management;
- distributed generation; and
- other renewable resources.

These alternatives, and the reasons for their not being considered in detail in this analysis, are addressed below.

SITE ALTERNATIVES ELIMINATED FROM THIS ANALYSIS

CEQA guidelines state that the alternatives discussion need not consider alternatives that are either infeasible or do not avoid significant environmental impacts. The following sites were considered as alternatives to the SSU6, but were eliminated from further consideration for the reasons noted.

Site 1: The location is directly adjacent to the current project site. Possible difficulty in engineering the plant make practical utilization of the existing wells on the site, and potential need to increase the amount of agricultural land removed permanently from production. Possible advantages include larger buffer between plant and Y-c rail habitat, reducing potential construction noise impacts to clapper rails, and SS refuge visitors and residence.

Site 2: The CO2 well/Dry Ice Plant site north of the current site. There is insufficient data available regarding the geothermal resources in this area of the KGRA, as well as geophysical data needed to site wells, pads, and the power plant. Site control is unknown at this time. Electrical interconnection providing IID's

desired dual connection for reliability would require approximately two additional five mile segments of transmission line in addition to that in the current proposal.

TECHNOLOGY ALTERNATIVES

Conservation and Demand-Side Management

Conservation and demand-side management (DSM) include a variety of approaches, including energy efficiency and conservation, building and appliance standards, load management and fuel substitution. Public Resources Code Section 25305(c) states that conservation, load management, or other demand reducing measures reasonably expected to occur shall be explicitly examined in the Energy Commission's energy forecasts and shall not be considered as alternatives to a proposed facility during the siting process. The forecast that will address this issue is the Energy Commission's California Energy Outlook. Thus, such alternatives are not included in this analysis. Since 1975, the displaced peak demand from all of these efforts has been roughly the equivalent of eighteen 500-MW power plants. At a state level, the annual impact of building and appliance standards has increased steadily, from 600 MW in 1980 to 5,400 MW in 2000, as more new buildings and homes are built under increasingly efficient standards. Savings from energy efficiency programs implemented by utilities and state agencies have also increased (from 750 MW to 3,300 MW). Recent demand reducing proposals from the Governor and Legislature have proven to have an impact by reducing consumption by an average of 3,500 MW during the summer of 2001 (CEC 2001a). In addition, voluntary conservation measures adopted by residential and commercial/industrial users led to a 7.5 percent drop in electricity use throughout the state as of August 2001, but that dropped to 1.5 percent in October 2001 (CEC 2001a). There was a 0.7 percent increase in energy used in February 2002 compared to February 2001 (CEC 2002). However, in comparison to February 2000, there was a 5.5 percent decrease in energy consumption in February 2002 (CEC 2002).

GENERATION TECHNOLOGY ALTERNATIVES

Staff considered several alternative generation technologies including a plant that burns fossil fuels: solar, wind, biomass, and hydropower.

Solar Generation

There are two types of solar generation: solar thermal power and photovoltaic (PV) power generation.

Solar thermal power generation involves the conversion of solar radiation to thermal energy, which is then used to run a conventional steam power system. Solar thermal is a viable alternative to conventional generation systems and, depending on the technology, is suited to either distributed generation on the kW scale or to centralized power generation on scales up to several hundred MW. Solar thermal systems utilize three designs to generate electricity: parabolic trough concentrating collectors, power tower/heliostat configurations, and parabolic dish collectors. Parabolic trough and power tower systems typically run conventional power units, such as steam turbines, while parabolic dish systems power a small engine at the focal point of the collector. PV power generation involves the direct conversion of light to electricity. PV is best suited to distributed generation uses rather than centralized power generation. PV is the

most capital intensive of any alternative generation technology (Aspen 2001). PV power systems consist of solar electric modules (built from PV cells) assembled into arrays of varying sizes to produce electric power proportional to the area of the array and the intensity of the sunlight. PV arrays can be mounted on either the ground or on buildings. They can be installed on dual-purpose structures such as covered parking lots.

Solar resources would require large land areas in order to generate 200 MW of electricity. Specifically, assuming location in an area receiving maximum solar exposure such as desert areas of Imperial County, central receiver solar thermal projects require approximately five acres per MW, so 200 MW would require approximately 1000 acres, or over 10 times the amount of land area taken by the proposed plant site and linear facilities. One square kilometer of PV generation (400 acres) can produce 100 MW of power, so 200 MW would require approximately 800 acres or over 10 times the amount of land area required for the proposed SSU6 project.

Although air emissions are significantly reduced or eliminated for solar facilities, these facilities can have significant visual effects. Solar generation results in the absence or reduction in air pollutant emissions, and visible plumes. Water consumption for solar generation is substantially less than for a geothermal or natural gas fired plant because there is no thermal cooling requirement. In addition, the large avian populations, migratory bird pathways, and relatively large populations of threatened or endangered birds in the area near the Salton Sea, and Imperial Valley would require careful analysis of potential impacts from either solar or PV generation at scale.

Like all technologies generating power for sale into the State's power grid, solar thermal facilities and PV generation require near access to transmission lines. Large solar thermal plants must be located in desert areas with high direct normal insolation, and in these remote areas, transmission availability is limited. Additionally, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of sunlight. Therefore, solar thermal power and photovoltaic power generation would not successfully meet the project objectives.

Wind Generation

Wind carries kinetic energy that can be used to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy into electricity. Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW. California's 1,700 MW of wind power represents 1.5 percent of the state's electrical capacity (Aspen 2001).

Although air emissions are significantly reduced or eliminated for wind facilities, these facilities can have significant visual effects. Wind turbines have also caused bird mortality (especially for raptors) resulting from collision with rotating blades although this effect is more noted in the Altamont Pass area than in other parts of the state. The large avian populations, migratory bird pathways, and relatively large populations of

threatened or endangered birds in the area near the Salton Sea, and Imperial Valley would require careful analysis of utilizing wind resources.

Wind resources require large land areas in order to generate 200 MW of electricity. Depending on the size of the wind turbines, wind generation “farms” generally can require between five and 17 acres to generate one megawatt (CEC 2001b). A 200 MW plant would therefore require between 1,000 and 3,400 acres. Although 7,000 MW of new power wind capacity could cost-effectively be added to California’s power supply, the lack of available transmission access is an important barrier to wind power development (Beck et al. 2001). California has a diversity of existing and potential wind resource regions that are near load centers such as San Francisco, Los Angeles, San Diego and Sacramento (CEC 2001c). However, wind energy technologies cannot provide full-time availability due to the natural intermittent availability of wind resources. Therefore, wind generation technology would not meet the project’s goal, which is to provide load-serving capacity.

Biomass Generation

Biomass generation uses a waste vegetation fuel source such as wood chips (the preferred source) or agricultural waste. The fuel is burned to generate steam. Biomass facilities generate substantially greater quantities of air pollutant emissions than natural gas burning facilities. In addition, biomass plants are typically sized to generate less than 20 MW, which is substantially less than the capacity of the 200 MW SSU6 project. At the peak of the biomass industry, 66 biomass plants were in operation in California, but as of 2001, only about 30 direct-combustion biomass facilities were in operation (CEC 2001d).

In order to generate 200 MW, ten 20 MW biomass facilities would be required. These power plants would have potentially significant environmental impacts of their own.

Hydropower

While hydropower does not require burning fossil fuels and may be available in California, this power source can cause significant environmental impacts, due primarily to the inundation of many acres of potentially valuable habitat and the interference with fish movements during their life cycles. In addition, planning and permitting time is on the order of 10 years. Though IID currently owns 85 MW of hydroelectric generation capacity, it would not be practical to expand that capacity by 200 MW. As a result, it is extremely unlikely that new large hydropower facilities could be developed and permitted in California within the next several years (Aspen 2001).

Conclusion Regarding Alternative Technologies

Alternative generation typically has specific resource needs, environmental impacts, permitting difficulties, and intermittent availability. Therefore, these technologies do not fulfill a basic objective of the proposed project to provide load-serving capability in order to ensure a reliable supply of electricity for Imperial County and California. Consequently, staff does not believe that these renewable technologies present feasible alternatives to the proposed project.

CONCLUSIONS

Staff does not consider alternative technologies (solar, wind, biomass, and hydroelectric) to be feasible alternatives to the proposed project. While the No Project Alternative would eliminate all impacts of this project, the benefits of increasing in-state generation, increased capacity for Imperial County and expanding the renewables portfolio, would not be achieved. This would ensure that environmental impacts could be shifted to other power plant locations within the state, or across the nearby border with Mexico, where impacts could be greater than those that would result from the construction and operation of the SSU6.

The two site alternatives considered in this section offer a few advantages and several disadvantages in comparison to the proposed project. Similar to the proposed project, all the alternative sites would have the potential to cause potentially significant air quality, biological, and linear facility impacts. Therefore, no alternative site is recommended over the proposed project.

Because the impacts of the SSU6 proposal are still, to a degree, under study and not yet determined, a complete alternatives analysis cannot be prepared at this time. This analysis will be revised prior to the publication of the Final Staff Assessment.

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Placeholder for **Alternatives Figure 1**

GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

INTRODUCTION

The project General Conditions Including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions;
- establish requirements for facility closure plans; and
- specify conditions of certification that follow each technical area that contain the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

GENERAL CONDITIONS OF CERTIFICATION

DEFINITIONS

To ensure consistency, continuity and efficiency, the following terms, as defined, apply to all technical areas, including Conditions of Certification:

SITE MOBILIZATION

Moving trailers and related equipment onto the site, usually accompanied by minor ground disturbance, grading for the trailers and limited vehicle parking, trenching for construction utilities, installing utilities, grading for an access corridor, and other related activities. Ground disturbance, grading, etc. for site mobilization are limited to the portion of the site necessary for placing the trailers and providing access and parking for

the occupants. Site mobilization is for temporary facilities and is, therefore, not considered construction.

GROUND DISTURBANCE

Onsite activity that results in the removal of soil or vegetation, boring, trenching or alteration of the site surface. This does not include driving or parking a passenger vehicle, pickup truck, or other light vehicle, or walking on the site.

GRADING

Onsite activity conducted with earth-moving equipment that results in alteration of the topographical features of the site such as leveling, removal of hills or high spots, or moving of soil from one area to another.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

- the installation of environmental monitoring equipment;
- a soil or geological investigation;
- a topographical survey;
- any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; or
- any work to provide access to the site for any of the purposes specified in a., b., c., or d.

START OF COMMERCIAL OPERATION¹

For compliance monitoring purposes, “commercial operation” is that phase of project development which begins after the completion of start-up and commissioning, where the power plant has reached steady-state production of electricity with reliability at the rated capacity. For example, at the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

A Compliance Project Manager (CPM) will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

¹ A different definition of “Start of Commercial Operation,” may be included in the Air Quality (AQ) section (per District Rules or Federal Regulations). In that event, the definition included in the AQ section would only apply to that section.

4. documenting and tracking compliance filings; and
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval the approval will involve all appropriate staff and management.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Pre-Construction and Pre-Operation Compliance Meeting

The CPM may schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

Energy Commission Record

The Energy Commission shall maintain as a public record, in either the Compliance file or Docket file, for the life of the project (or other period as required):

- all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- all monthly and annual compliance reports filed by the project owner;
- all complaints of noncompliance filed with the Energy Commission; and
- all petitions for project or condition changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

It is the responsibility of the project owner to ensure that the general compliance conditions and the conditions of certification are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, compliance conditions, or ownership. Failure to comply with any of the conditions of certification or the general compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate. A

summary of the General Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section. The designation after each of the following summaries of the General Compliance Conditions (**COM-1, COM-2, etc.**) refers to the specific General Compliance Condition contained in **Compliance Table 1**.

COM-1, Unrestricted Access

The CPM, responsible Energy Commission staff, and delegate agencies or consultants, shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the files and records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

COM-2, Compliance Record

The project owner shall maintain project files onsite, or at an alternative site approved by the CPM, for the life of the project unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all “as-built” drawings, all documents submitted as verification for conditions, and all other project-related documents.

COM-3, Compliance Verification Submittals

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission’s procedure(s) to ensure post-certification compliance with adopted conditions.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;
2. providing appropriate letters from delegate agencies verifying compliance;
3. Energy Commission staff audits of project records; and/or
4. Energy Commission staff inspections of mitigation or other evidence of mitigation.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal.** The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: “This submittal is for information only and is not required by a specific condition of certification.” When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

**Compliance Project Manager
02-AFC-2
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814**

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

COM-4, Pre-Construction Matrix and Tasks Prior to Start of Construction

Prior to commencing construction a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's **first** compliance submittal, and shall be submitted prior to the first pre-construction meeting, if one is held. It will be in the same format as the compliance matrix referenced below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project construction.

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

It is important that the project owner understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change based upon the Final Decision

COMPLIANCE REPORTING

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

COM-5, Compliance Matrix

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all compliance conditions in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable;
7. the compliance status of each condition (e.g., “not started,” “in progress” or “completed” (include the date); and
8. the project’s preconstruction and construction milestones, including dates and status (if milestones are required).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

COM-6, Monthly Compliance Report

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date on which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the **Key Events List**. **The Key Events List form is found at the end of this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and five copies (or amount specified by Compliance Project Manager) of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;
2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix which shows the status of all conditions of certification;
4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions which satisfied the condition;

5. a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;
6. a cumulative listing of any approved changes to conditions of certification;
7. a listing of any filings with, or permits issued by, other governmental agencies during the month;
8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;
9. a listing of the month's additions to the on-site compliance file;
10. any requests, with justification, to dispose of items that are required to be maintained in the project owner's compliance file; and
11. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolutions of any resolved complaints, and the status of any unresolved complaints.

COM-7, Annual Compliance Report

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix which shows the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Annual Compliance Report;
4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;
5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. a listing of filings made to, or permits issued by, other governmental agencies during the year;
7. a projection of project compliance activities scheduled during the next year;
8. a listing of the year's additions to the on-site compliance file;
9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section]; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved complaints, and the status of any unresolved complaints.

COM-8, Construction and Operation Security Plan

Thirty days prior to commencing construction, a site-specific Security Plan for the construction phase shall be developed and maintained at the project site. At least 60 days prior to the initial receipt of hazardous materials on-site, a site-specific Security Plan and Vulnerability Assessment for the operational phase shall be developed and maintained at the project site. The project owner shall notify the CPM in writing that the Plan is available for review and approval at the project site.

Construction Security Plan

The Construction Security Plan must address:

1. site fencing enclosing the construction area;
2. use of security guards;
3. check-in procedure or tag system for construction personnel and visitors;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
5. evacuation procedures.

Operation Security Plan

The Operations Security Plan must address:

1. permanent site fencing and security gate;
2. use of security guards;
3. security alarm for critical structures;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;
5. evacuation procedures;
6. perimeter breach detectors and on-site motion detectors;
7. video or still camera monitoring system;
8. fire alarm monitoring system;
9. site personnel background checks; and
10. site access for vendors and requirements for hazardous materials vendors to conduct personnel background security checks.

In addition, the project owner shall prepare a Vulnerability Assessment and implement site security measures addressing hazardous materials storage and transportation consistent with US EPA and US Department of Justice guidelines.

The CPM may authorize modifications to these measures, or may require additional measures depending on circumstances unique to the facility, and in response to industry-related security concerns.

COM-9, Confidential Information

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information, that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

COM-10, Department of Fish and Game Filing Fee

Pursuant to the provisions of Fish and Game Code Section 711.4, the project owner shall pay a filing fee in the amount of \$850. The payment instrument shall be provided to the Energy Commission's Project Manager (PM), not the CPM, at the time of project certification and shall be made payable to the California Department of Fish and Game. The PM will submit the payment to the Office of Planning and Research at the time of filing of the notice of decision pursuant to Public Resources Code Section 21080.5.

COM-11, Reporting of Complaints, Notices, and Citations

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded inquiries shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt, to the CPM. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30

years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place, planned closure, unplanned temporary closure and unplanned permanent closure.

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unplanned closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

GENERAL CONDITIONS FOR FACILITY CLOSURE

COM-12, Planned Closure

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least twelve months prior to commencement of closure activities (or other period of time agreed to by the CPM). The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

In addition, prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities, until Energy Commission approval of the facility closure plan is obtained.

COM-13, Unplanned Temporary Closure/On-Site Contingency Plan

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. (Also see the discussion sections for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than twelve months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

COM-14, Unplanned Permanent Closure/On-Site Contingency Plan

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the unlikely event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction monitoring of the project, Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Commission staff retains CBO authority when selecting a delegate CBO including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental control when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider. Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1230 et seq., but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by current law or regulations.

Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request that the Energy Commission conduct an informal investigation of alleged noncompliance with the Energy Commission's terms

and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and, within seven working days of the CPM's request, provide a written report of the results of the investigation, including corrective measures proposed or undertaken, to the CPM. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial report, within 48 hours, followed by a written report filed within seven days.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;
3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and
4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum which fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et seq.

The Chairman, upon receipt of a written request stating the basis of the dispute, may grant a hearing on the matter, consistent with the requirements of noticing provisions.

The Energy Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Cal. Code Regs., tit. 20, §§ 1232-1236).

POST CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION: AMENDMENTS, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify project design, operation or performance requirements, and to transfer ownership or operational control of the facility.

A petition is required for **amendments** and for **insignificant project changes** as specified below. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval process applies are explained below.

AMENDMENT

A proposed modification will be processed as an amendment if it involves a change to, a deletion of, or a new condition of certification, or if the modification will result in a potential for environmental impact. Changes to ownership or operational control also require an amendment.

INSIGNIFICANT PROJECT CHANGE

The proposed modification will be processed as an insignificant project change if it does not require changing the language in a condition of certification, have a potential for significant environmental impact, or cause the project to violate laws, ordinances, regulations or standards.

VERIFICATION CHANGE

As provided in Title 20, Section 1770 (d), California Code of Regulations, a verification may be modified by staff without requesting an amendment to the decision if the change does not conflict with the conditions of certification.

COM-6, KEY EVENTS LIST

PROJECT: **Salton Sea Unit 6 Power Project**

DOCKET #: **02-AFC-02**

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION

DATE

| | |
|---|--|
| Certification Date/Obtain Site Control | |
| Online Date | |
| POWER PLANT SITE ACTIVITIES | |
| Start Site Mobilization | |
| Start Ground Disturbance | |
| Start Grading | |
| Start Construction | |
| Begin Pouring Major Foundation Concrete | |
| Begin Installation of Major Equipment | |
| Completion of Installation of Major Equipment | |
| First Combustion of Gas Turbine | |
| Start Commercial Operation | |
| Complete All Construction | |
| TRANSMISSION LINE ACTIVITIES | |
| Start T/L Construction | |
| SYNCHRONIZATION WITH GRID AND INTERCONNECTION | |
| COMPLETE T/L CONSTRUCTION | |
| FUEL SUPPLY LINE ACTIVITIES | |
| Start Gas Pipeline Construction and Interconnection | |
| COMPLETE GAS PIPELINE CONSTRUCTION | |
| WATER SUPPLY LINE ACTIVITIES | |
| START WATER SUPPLY LINE CONSTRUCTION | |
| COMPLETE WATER SUPPLY LINE CONSTRUCTION | |

TABLE 1
COMPLIANCE SECTION
SUMMARY of GENERAL CONDITIONS OF CERTIFICATION

| CONDITION NUMBER | PAGE # | SUBJECT | DESCRIPTION |
|-------------------------|---------------|--|---|
| COM-1 | 4 | Unrestricted Access | The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site. |
| COM-2 | 4 | Compliance Record | The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files. |
| COM-3 | 4 | Compliance Verification Submittals | The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether the condition was satisfied by work performed by the project owner or his agent. |
| COM-4 | 5 | Pre-construction Matrix and Tasks Prior to Start of Construction | Construction shall not commence until all of the following activities/submittals have been completed: <ul style="list-style-type: none"> ▪ property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns; ▪ a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction; ▪ all pre-construction conditions have been complied with; and ▪ the CPM has issued a letter to the project owner authorizing construction. |
| COM-5 | 6 | Compliance Matrix | The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification. |
| COM-6 | 6 | Monthly Compliance Report (including a Key Events List) | During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List. |

| CONDITION NUMBER | PAGE # | SUBJECT | DESCRIPTION |
|-----------------------------|-------------------|---|---|
| COM-7 | 7 | Annual Compliance Reports | After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. |
| COM-8 | 8 | Security Plans | Thirty days prior to commencing construction, the project owner shall submit a Security Plan for the construction phase. Sixty days prior to initial receipt of hazardous material on site, the project owner shall submit an Security Plan & Vulnerability Assessment for the operational phase. |
| COM-9 | 9 | Confidential Information | Any information the project owner deems confidential shall be submitted to the Dockets Unit with an application for confidentiality. |
| COM-10 | 9 | Dept of Fish and Game Filing Fee | The project owner shall pay a filing fee of \$850 at the time of project certification. |
| COM-11 | 9 | Reporting of Complaints, Notices and Citations | Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations. |
| COM-12 | 10 | Planned Facility Closure | The project owner shall submit a closure plan to the CPM at least twelve months prior to commencement of a planned closure. |
| COM-13 | 11 | Unplanned Temporary Facility Closure | To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation. |
| COM-14 | 12 | Unplanned Permanent Facility Closure | To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation. |

COMPLAINT REPORT/RESOLUTION FORM

| |
|--|
| PROJECT NAME: Salton Sea Unit 6 Project AFC Number: 02-AFC-02 |
| COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: |
| Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence: |
| Description of complaint (including dates, frequency, and duration): |
| Findings of investigation by plant personnel: Indicate if complaint relates to violation of Energy Commission requirement: Date complainant contacted to discuss findings: |
| Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information: |
| If corrective action necessary, date completed: Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached) |
| This information is certified to be correct. Plant Manager's Signature: _____ Date: _____ |

(Attach additional pages and supporting documentation, as required.)

PREPARATION TEAM

SALTON SEA UNIT 6 PROJECT PSA PREPARATION TEAM

| | |
|--|--|
| Executive Summary | Robert Worl |
| Introduction | Robert Worl |
| Project Description | Robert Worl |
| Air Quality | Will Walters, Lisa Blewitt, and Keith Golden |
| Biological Resources | Natasha Nelson |
| Cultural Resources | Roger Mason and Gary Reinoehl |
| Hazardous Materials | Geoff Lesh and Rick Tyler |
| Land Use | David Flores |
| Noise and Vibration | Steve Baker |
| Public Health | Ramesh Sundareswaran |
| Socioeconomics | Joseph Diamond, Ph.D. |
| Soil and Water Resources | Michael Krolak |
| Traffic and Transportation | Ken Peterson |
| Transmission Line Safety and Nuisance | Obed Odoemelam, Ph.D. |
| Visual Resources | James Adams, Will Walters, and Erik Knight |
| Waste Management | Ellie Townsend-Hough |
| Worker Safety and Fire Protection | Geoff Lesh. and Rick Tyler |
| Facility Design | Kevin Robinson, Al McCuen and Steve Baker |
| Geology, Mineral Resources, and Paleontology | Dal Hunter, Ph.D. |
| Power Plant Efficiency | Shahab Khoshmashrab |
| Power Plant Reliability | Shahab Khoshmashrab |
| Transmission System Engineering | Demetrio Bucaneg, Sudath Arichchige, and Al McCuen |
| Alternatives | Robert Worl |
| General Conditions | Connie Bruins |
| Project Assistant | Angela Hockaday |
| Support Staff | Angela Hockaday |